Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States

Fall 2010 CBMS Survey

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Foreword

Every five years since 1965, the Conference Board of the Mathematical Sciences (CBMS) has sponsored a national survey of undergraduate mathematical and statistical sciences in the nation's two- and four-year colleges and universities. The 2010 CBMS survey, conducted with NSF support, is the tenth report in this series. The CBMS surveys study two-year college mathematics programs and the undergraduate programs of mathematics departments and statistics departments at four-year colleges and universities. Three different instruments are sent to a stratified random sample of these three populations, and this report presents the estimates computed using the responses to these questionnaires. This is the first of the CBMS surveys that could be completed online.

This report is organized as follows.

- Chapter 1 gives an overview of the results of the 2010 CBMS survey; tables in this chapter are designated with the label S, for “summary”. The tables in this chapter are broken down into more detail in later chapters.
- Chapter 2 reports on the special projects of the 2010 survey; tables in this chapter are designated with the label SP, for “special project”. The special projects in 2010, which were determined after consultation with representatives of the professional societies, are the mathematical education of pre-college teachers, practices in distance-learning courses, academic resources available to undergraduates, interdisciplinary courses in four-year mathematics departments, trends in dual enrollments, requirements in the national majors in mathematics and statistics in four-year departments, availability of upper-level classes in four-year mathematics departments and statistics departments, estimates of post-graduation plans of graduates of four-year mathematics departments and statistics departments, and assessment in four-year mathematics departments and statistics departments.
- Chapter 3 focuses on course enrollments and the numbers of undergraduate degrees awarded by mathematics and statistics departments at four-year colleges and universities, including data on who is teaching courses; tables in this chapter are labeled by E, for “enrollment”.
- Chapter 4 concerns the demographics of faculty in mathematics and statistics departments of four-year colleges and universities; tables in this chapter are labeled by F, for “faculty”. As explained in this chapter, these data were obtained from the Annual Survey, conducted by the American Mathematical Society.
- Chapter 5 studies courses taught primarily to beginning students in mathematics and statistics departments at four-year colleges and universities; tables in this chapter are labeled by FY, for “first year”.
- Chapter 6 focuses on enrollments, course offerings, and instructional practices at two-year colleges; tables in this chapter are labeled with TYE, for “two-year enrollment”.
- Chapter 7 presents faculty demographics and special topics at two-year colleges; tables in this chapter are labeled with TYF, for “two-year faculty”.

Other important information is included in appendices:

- Appendix I contains the enrollments (both with, and without, distance-learning enrollments) for each individual course listed on the four-year mathematics and statistics department questionnaires, along with past enrollments (with distance-learning enrollments included). Standard errors for the 2010 course enrollments are also included.
- Appendix II contains details about the survey procedure.
- Appendix III gives the list of responders to the 2010 survey.
- Appendices IV, V, and VI give the actual questionnaires used in the CBMS survey. The instruments themselves can be useful in interpreting the results of the survey.
- Appendix VII gives the standard errors for each of the tables. It is important to remember that the survey is based on a sample, and the numbers provided in the tables are estimates that are subject to sampling error.

Throughout this report, enrollments do not include dual enrollments, unless indicated by table caption. Depending upon the caption on the table, enrollments may, or may not, include distance-learning enrollments. One can use Appendix I to find enrollments of courses at four-year departments for fall 2010 with, or without, distance-learning enrollments included (this is not the case for previous CBMS surveys, as past appendices give enrollments only with distance-learning enrollments included). In the text of this report, whether the enrollments cited include, or do not include, distance-learning enrollments is generally determined by the comparable historical data available.

This report refers to earlier CBMS reports (called CBMS2005, CBMS2000, etc.). This report and the preceding four CBMS reports are available online at: http://www.ams.org/profession/data/cbms-survey/cbms-reports. Other references can be found in the bibliography at the end of the report.

Chapter 1

Summary of CBMS2010 Report

Highlights of Chapter 1

A. Enrollments

- Between fall 1995 and fall 2010, four-year college and university enrollments grew by about 43%, while enrollments in those institutions' mathematics and statistics departments grew by about 36%. See Table S.1.
- Between fall 1995 and fall 2010, public two-year college enrollments (excluding computer science) grew by about 30%, while enrollments in those institutions' mathematics programs (excluding computer science courses) grew by about 41%. See Table S.1.
- Between fall 2005 and fall 2010, four-year college and university enrollments grew by about 13%, while enrollments in those institutions' mathematics and statistics departments grew by about 26%. Fall 2010 enrollments increased over fall 2005 in all major course categories at four-year mathematics and statistics departments except upper-level statistics enrollments in mathematics departments, which declined about 6%. See Tables S.1 and S.2.
- Between fall 2005 and fall 2010, public two-year college enrollments grew by 11%, while enrollments in these institutions' mathematics programs grew by about 19% (21% including dual enrollments). The increases in enrollment occurred in all course categories. See Tables S.1 and S.2.
- Between fall 2005 and fall 2010, enrollments in precollege-level courses at four-year mathematics departments increased 4%, but they were still 6% below the precollege-level mathematics enrollments in 1995. See Table S.2.
- Between fall 2005 and fall 2010, enrollments in introductory-level mathematics courses (including precalculus courses) at four-year college and university mathematics departments increased 22%, and they were 41% above the introductory-level enrollments in 1995. See Table S.2.
- In fall 2010, enrollments in calculus-level courses (including linear algebra, differential equations, discrete mathematics and various calculus courses) in mathematics departments at four-year institutions were about 27% higher than in 2005, and about 40% higher than in 1995. See Table S.2.
- In fall 2010, enrollments in advanced-level mathematics courses at four-year college and university mathematics departments were about 34% higher than in 2005, and about 56% higher than in 1995. See Table S.2.
- In four-year college and university mathematics departments, elementary-level statistics enrollments in fall 2010 exceeded the levels of fall 2005 by about 56%, and have more than doubled since fall 1995. Upper-level statistics enrollments declined about 6% between 2005 and 2010, but were about 14% above the 1995 level. These changes may be due in part to the addition of a new course to the list of lower-level courses. See Table S.2.
- In four-year college and university statistics departments, elementary-level statistics enrollments in fall 2010 exceeded fall 2005 levels by 50%, and were about 65% larger than in fall 1995. Upper-level statistics enrollments increased about 13% between 2005 and 2010, and were about 69% above the 1995 level. See Table S.2.
- In public two-year colleges, enrollments increased in 2010 over 2005 by 19% in precollege-level mathematics, 15% in introductory-level mathematics and Precalculus, 28% in calculus-level mathematics, and 17% in elementary statistics and probability courses. See Table S.2.
- Computer science enrollments in mathematics departments of four-year colleges and universities, which had dropped by 55% from 2000 to 2005, increased 35% from 2005 to 2010, but remained 37% below the 2000 level. See Table S.2.

B. Bachelors degrees granted

- The total number of bachelors degrees awarded through the nation's mathematics and statistics departments (including some computer science degrees) declined very slightly (less than 0.3%) between the 2004-2005 and the 2009-2010 academic years, and about 13% fewer bachelors degrees were awarded by mathematics and statistics departments in 2009-2010 than in 1989-1990. If degrees in computer science are excluded from the count, then the number of bachelors degrees awarded in mathematics and statistics in 2009-2010 was 2% above the total in 2004-2005, and less than 1% below the total in 1989-1990. See Table S.3.

- The number of bachelors degrees in computer science awarded through mathematics and statistics departments decreased by 18% from 2004-2005 to 2009-2010, and by 58% from 1989-1990 to 2009-2010, but is still a significant source of computer science majors compared to the number of computer science bachelors degrees awarded by doctoral computer science departments. See Table S.3.
- The number of mathematics education bachelors degrees granted through mathematics departments increased by about 7% between 2004-2005 and 2009-2010, and decreased by about 28% when compared with 1999-2000 (when it was the highest percentage in the last five CBMS studies). See Table S.3.
- The percentage of bachelors degrees awarded to women through U.S. mathematics and statistics departments rose from 40.4% in 2004-2005 to 42.5% in 2009-2010 (it was 43.4% in 1999-2000). If computer science degrees are excluded, then the percentage of degrees awarded to women through U.S. mathematics and statistics departments rose from 43.5% in 2004-2005 to 45.2% in 2009-2010 (it was 46.7% in 1999-2000). See Table S.3.

C. Appointment type of instructors of undergraduate mathematics and statistics courses

- The percentage of undergraduate sections in mathematics departments of four-year colleges and universities taught by tenured, tenure-eligible or permanent faculty increased between fall 2005 and fall 2010 from 48% to 49%, and from 47% to 49% in statistics departments. In public two-year colleges, the percentage of mathematics and statistics sections taught by full-time faculty declined from 56% in fall 2005 to 54% in fall 2010. See Tables S.4 and S.5.

D. Pedagogical methods used in teaching undergraduate mathematics and statistics courses

- In public two-year colleges in fall 2010, Mainstream Calculus I was taught "mostly by lecture" in 66% of the sections. For Calculus II, the percentage jumped to 85% (and Non-Mainstream Calculus I and II had comparable percentages); for Elementary Statistics, the percentage was 81%. See Tables S.10, S.11, and S.12.
- The 2010 CBMS survey of four-year mathematics departments included a special study of pedagogy in teaching College Algebra and Introductory Statistics, and in statistics departments on teaching Introductory Statistics (in both cases the statistics course had no calculus prerequisite). In the survey of mathematics departments, 65% characterized their College Algebra courses as "primarily using a traditional approach". Methods of teaching Introductory Statistics in mathematics and statistics departments in fall 2010 can be compared using the 2010 survey data, which shows greater use of real data and technology in courses taught in statistics departments and slightly greater use of additional assignments (such as projects, oral presentations or written reports) in mathematics departments. See Tables S.13A and S.13B.

E. The number of faculty

- The total size of mathematics faculties (including both full-time and part-time) in four-year colleges and universities remained roughly the same in fall 2010 as in fall 2005, and the number of full-time faculty increased by about 2% from fall 2005 to fall 2010. From 1995 to 2010, the number of full-time mathematics faculty in four-year departments grew by 14%, while mathematics departments' total course enrollments grew by 35%. In statistics departments with doctoral programs (which were the only statistics departments in which faculty demographics were gathered in 2005), the total number of full-time plus part-time statistics faculty increased 5% from 2005, while the number of full-time doctoral-level statistics faculty increased 6% from 2005. Doctoral statistics department enrollments have more than doubled since 1995, but are up only 11% from fall 2000. See Table S.14.
- In public two-year college mathematics programs, the number of full-time (permanent and temporary) faculty increased by 16% from fall 2005 to fall 2010, and by 40% from 1995 to 2010. Public two-year college mathematics program enrollments (excluding computer science courses) rose 41% from 1995 to 2010. See Table S.14.
- The number of part-time mathematics faculty at four-year departments continued a trend of slow decline, decreasing by 7% over 2005, and the number of part-time statistics faculty at doctoral statistics departments decreased 6% from 2005. See Table S.14.
- The number of part-time faculty in mathematics programs at public two-year colleges increased by 29% from 2005 to 2010. Total public two-year mathematics faculty has grown by 56% from 1995 to 2010. The 2010 CBMS survey is the first CBMS survey to report a larger number of total mathematics faculty (full-time plus part-time) at two-year departments than at four-year departments. See Table S.14.
- There was a 5% decrease in the sum of tenured plus tenure-eligible (TTE) appointments in four-year mathematics departments from 2005 to 2010, while the category of other full-time faculty increased by 28%; most of the decline in the numbers of

TTE faculty was in tenure-eligible appointments. In doctoral-level statistics departments, from 2005 to 2010, the total number of tenured plus tenure-eligible statistics faculty grew very slightly, and the number of other full-time statistics faculty increased by 32%. In public two-year college mathematics programs, the number of full-time permanent faculty grew by 11%. See Table S.15.

F. Gender and ethnicity in the mathematical sciences faculty

- In fall 2010, in four-year college and university mathematics departments, women comprised 29% of all full-time faculty, 21% of all tenured faculty, and 34% of all tenure-eligible faculty; each of these percentages was up several percentage points from 2005. In doctoral statistics departments in fall 2010, women were 26% of all full-time faculty, 16% of tenured faculty, and 40% of tenure-eligible faculty, and all of these percentages were larger than in 2005. In public two-year college mathematics programs in fall 2010, women comprised 50% of the full-time faculty positions (the same as in 2005), and 54% of the full-time faculty of age less than 40 were female (up from 49% in 2005). See Table S.16.
- Very little change in the distribution of ethnicities of mathematics and statistics departments faculty in four-year colleges and universities occurred between fall 2005 and fall 2010. In mathematics departments, the percentage of full-time White male faculty dropped from 59% to 56% (with a corresponding 2% point gain in the percentage of White female faculty). Statistics departments (masters-level and doctoral-level combined) showed White male full-time faculty dropping from 55% to 49% and some gains in the percentage of Asian faculty. The percentages of Black and Hispanic faculty remained small in both mathematics and statistics departments. See Tables S.19 and S.20.
- Comparable tables for distribution of ethnicities in mathematics programs at two-year colleges can be found in Chapter 7, Tables TYF.10-13. In fall 2010, 16% of the full-time permanent faculty in mathematics programs were from ethnic minorities, a total of 1,566 faculty, up from 14% in 2005. The majority of the ethnic groups represented were Asian/Pacific Islander or Black (non-Hispanic).

G. Changes in the mathematical sciences faculty due to deaths and retirements

- Table S.21 shows that 360 deaths and retirements of mathematics department faculty from four-year colleges and universities occurred during 2009-2010, compared with 499 in 2004-2005 and 462 in 1999-2000. Furthermore, Table S.17 shows that the percentage of tenured and tenure-eligible mathematics faculty 65 and older increased from 8% in 2005 to 12% in 2010. Both facts suggest that some senior faculty may have postponed retirement, perhaps because of problems in the nation's economy. This data was not collected in two-year colleges in 2010. See Tables S.17 and S.21.

An overview of enrollments (Tables S.1, S.2, and S.3)

Between fall 2005 and fall 2010, enrollments in mathematical sciences courses at four-year colleges and universities grew at a rate that was twice the growth rate in total undergraduate enrollment. This mathematical sciences course enrollment growth helped to reverse the decline in mathematical sciences course enrollments, compared to general institutional enrollments, which had occurred over the previous decade. A particularly disturbing trend noted in the 2005 CBMS report was that enrollments in mathematics and statistics from fall 2000 to fall 2005 had actually declined, while enrollments in four-year colleges and universities rose by 13%.

We begin by noting the kinds of enrollment that were collected in the 2010 CBMS survey (for more details, consult the survey questionnaires, which are in Appendix IV). Departments were asked first about "dual enrollments"; dual-enrollment courses are defined as "courses conducted on a high school campus and taught by high school teachers, for which high school students may receive high school credit and, simultaneously, college credit". Dual enrollments, which are discussed in Chapter 2, are not counted as enrollments in CBMS enrollment tables, unless the table specifically indicates that they are included. On the 2010 CBMS survey questionnaires, departments were asked to break out distance-learning enrollments from other enrollments, except in advanced-level courses in four-year departments. Distance-learning courses are defined to be "courses in which the majority of instruction occurs with the student and instructor separated in time and space (e.g. courses in which the majority of instruction is taught online or by computer software or by correspondence)". Tables indicate if distance-learning enrollments are included; Appendix I presents enrollments for courses on the four-year departments survey questionnaires both with, and without, distance-learning enrollments included (prior CBMS survey Appendices give enrollments with distance learning included).

Table S.1 gives an overall historical view of enrollments in courses taught in mathematics and statistics departments of four-year U.S. colleges and universities, and in mathematics programs of public two-year colleges. The table also presents estimates of institutional enrollments, so that one can compare changes in mathematical sciences course enrollments with overall changes in institutional enrollments. The table presents combined enrollments (including distance-learning enrollments but not dual enrollments) in four-year mathematics and statistics departments in fall 1995, 2000, 2005, and 2010, for mathematics, statistics, and computer science courses, with the 2010 enrollment broken down into mathematics department enrollment and statistics department enrollment; the enrollments for mathematics programs in two-year colleges are also presented. This enrollment data was obtained from the CBMS surveys from those years. The estimates of the total enrollment in four-year colleges and universities, and in two-year colleges, came from the National Center for Educational Statistics (NCES) and are based on data that post-secondary education institutions must submit to the Integrated Post-secondary Educational Data System (IPEDS). Most national data cited in this report are drawn from the NCES report *Projections of Education Statistics to 2019*, which is available at http://nces.ed.gov/programs/projections/projections2019/tables/asp.

From Table S.1 we see that between fall 1995 and fall 2010, four-year college and university enrollments grew by about 43%, while enrollments in those institutions' mathematics and statistics departments grew by about 36%, and much of the growth in mathematical sciences enrollments occurred between fall 2005 and fall 2010. Figure S.1.1 shows the growth in enrollments in mathematical sciences courses taught in mathematics and statistics departments of four-year colleges and universities, and in two-year colleges, in fall 1990, 1995, 2000, 2005, and 2010.

At public two-year college mathematics programs, the mathematical sciences course enrollments continued to rise faster than the total enrollments of two-year colleges. NCES data show that total enrollments in the nation's public two-year colleges (TYCs) increased by about 30% between fall 1995 and fall 2010 (11% from 2005 to 2010). CBMS survey data suggest that the same fifteen-year period saw a roughly 41% growth in the mathematics and statistics enrollments in the mathematics departments and programs of the nation's public TYCs (19% from 2005 to 2010). We note that the estimate of 41% was computed by removing computer science enrollments from the 1995 total enrollment data of Table S.1 (since the CBMS surveys no longer gather computer science enrollments from two-year college mathematics programs), and using 99% of those course enrollments (since the sample frame in 2005 and following years includes only public two-year colleges, and NCES noted in 2002 that public two-year colleges accounted for over 99% of the total two-year college enrollment), and hence estimating the 1995 total public two-year college mathematics enrollment at 1,440,450. Additional information can be found in Chapter 6, Tables TYE.1 and TYE.2.

Table S.2 begins the process of breaking the total mathematical sciences course enrollment down into its component parts. Among four-year college and university mathematics departments, the enrollment course categories used were precollege-level courses, introductory-level courses, calculus-level courses, and advanced-level courses. In the 2010 CBMS survey, the precollege courses (e.g. arithmetic, pre-algebra, elementary algebra, intermediate algebra) were treated as one block and not itemized as they had been in previous CBMS surveys. The intermediate-level course list was essentially unchanged from the previous CBMS survey, and included courses in liberal arts mathematics, mathematics for K-8 mathematics teachers, and a cluster of courses with names such as College Algebra, Precalculus, and Trigonometry. The calculus-level courses included linear algebra, differential equations, discrete mathematics, and various calculus courses; from the individual course enrollments, which are included in Appendix I, we see that calculus courses accounted for 79% of the non-distance-learning enrollments in calculus-level courses. We note, again, that Tables S.1 and S.2 include distance-learning enrollments, and that Appendix I contains enrollments both with, and without, distance-learning enrollments included. Statistics courses, offered in either mathematics or statistics departments, were broken into elementary-level and upper-level, and computer science courses were broken into three levels. In 2010 for the first time, enrollments in computer science courses offered through statistics departments were not gathered in the CBMS survey, but they were gathered, as was done previously, from mathematics departments at four-year institutions.

Table S.2 also shows enrollments in various course categories in public two-year college mathematics programs. Direct comparisons between courses-categories in two-year and four-year departments are problematic because the course-categories (which can be seen by looking at the actual questionnaires that are reproduced in Appendix IV) sometimes contain different courses (e.g. linear algebra and differential equations are not calculus-level courses in the two-year college instrument).

In four-year college and university mathematics departments, the total of all course enrollments rose from 1,845,000 in 2005 to 2,310,000 in 2010, according to Table S.2, a 25% increase in total enrollment. All categories of courses, except upper-level statistics courses, showed increased enrollments in fall 2010 over fall 2005, and all categories of courses, except precollege-level courses and computer science courses, had enrollments in fall 2010 that were larger than those in fall 1995. The course-category for the four-year mathematics departments that had the largest enrollment growth from fall 2005 to fall 2010

TABLE S.1 Enrollment in (1000s) in undergraduate mathematics, statistics, and computer science courses taught in mathematics departments and statistics departments of four-year colleges and universities, and in mathematics programs of two-year colleges. Also NCES data on total fall enrollments in two-year colleges and four-year colleges and universities in fall 1995, 2000, 2005, and 2010. NCES data includes both public and private four-year colleges and universities, and includes only public two-year colleges. Enrollments include distance-learning enrollments but not dual enrollments.

	Four-Year College & University Mathematics & Statistics Departments						Two Year College Mathematics Programs[4]			
	Fall				2010 by Dept		Fall			
	1995	2000	2005	2010	Math	Stat	1995	2000	2005	2010
Mathematics	1471[1]	1614	1607	1971	1971	--	1384	1273	1580	1887
Statistics	208	245	260	371	262	109	72	74	117	137
Computer Science	100	124	59	77[2]	77	--[2]	43[2]	39[2]	--[2]	--[2]
Total	1779	1984	1925	2419	2310	109	1498	1386	1697	2024
NCES Total Fall Undergraduate Enrollments[3]	6739	7207	8476	9613			5278	5697	6184	6870

[1] These totals include approximately 2000 mathematics enrollments taught in statistics departments.

[2] Computer science totals in two-year colleges before 1995 included estimates of computer science courses taught outside of the mathematics program. In 1995 and 2000, only those computer science courses taught in the mathematics program were included. Starting in 2005, no computer science courses were included in the two-year mathematics survey, and starting in 2010, no computer science courses were included in the statistics survey.

[3] Data for 1995, 2000, 2005, and projections for 2010 are derived from Tables 24, 26, and 27 of the NCES publication "*Projections of Education Statistics to 2019*" at http://nces.ed.gov/programs/projections/projections2019/tables.asp.

[4] Starting in 2005, data on mathematics, statistics, and computer science enrollments in two-year colleges include only public two-year colleges.

was the category of elementary statistics courses, up 56% over 2005; among mathematics course-categories, the largest growth occurred in advanced-level mathematics courses, where enrollments were about 34% higher in fall 2010 than in fall 2005, and about 56% higher in fall 2010 than in fall 1995. The category with the next largest enrollment growth was calculus-level courses, where enrollments were about 27% higher in 2010 than in 2005, and 39% higher than calculus-level enrollments in 1995. Close behind calculus-level course enrollment growth was the growth in introductory-level course enrollments, which increased 22% in 2010 over 2005, and were 41% above the introductory-level enrollments in 1995. Precollege-level enrollments increased only 4% in 2010 over 2005, and they were still 6% below the precollege-level enrollments in 1995; precollege-level enrollments have remained relatively flat over the past fifteen years. The total number of all mathematics course enrollments in four-year college and university mathematics departments increased by about 34% over the fifteen-year period of 1995-2010, and all enrollments (including computer science and statistics) were up 35% over this time period.

Table S.2 shows that mathematics programs at public two-year colleges also had enrollment growth in all categories of courses. The largest growth from fall 2005 to fall 2010 occurred in the category of calculus-level courses, up 28% in fall 2010 over fall 2005, but only 7% over fall 1995. The next largest enrollment growth in two-year college mathematics program enrollments occurred in the category of "other" courses, up 24% in 2010 over 2005, and 44% over 1995. The enrollment growth in precollege-level courses was next, up 19% in 2010 over 2005, and 44% over 1995. Within precollege-level courses, enrollments in Arithmetic and Basic Mathematics increased 40% between 2005 and 2010 and 65% in Pre-algebra (see Table TYE.3). Introductory-level course enrollments (including Precalculus) were up 15% in 2010 over 2005, and 25% over 1995. The total enrollment in all mathematics and statistics courses taught in public two-year mathematics programs increased by 41% over the fifteen-year period of 1995-2010.

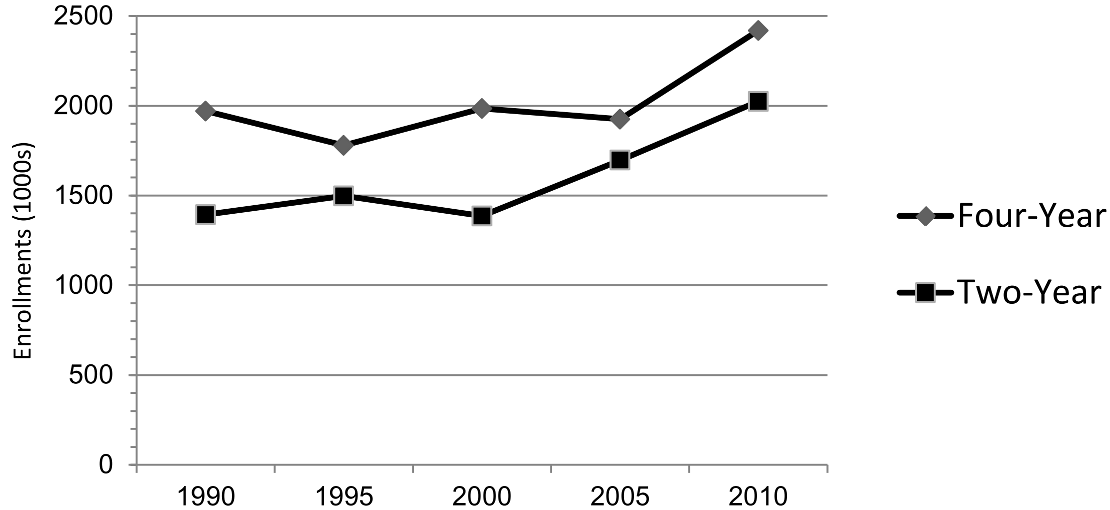

FIGURE S.1.1 Combined enrollment (in 1000s) in undergraduate mathematics, statistics, and computer science courses at four-year colleges and universities within mathematics departments and statistics departments, and within mathematics programs of two-year colleges: Fall 1995, 2000, 2005, and 2010. Data for 2005 include only public two-year colleges.

Note: Before 1995, two-year enrollment totals included computer science enrollments taught outside of the mathematics program. In 1995 and 2000, only computer science courses taught within the mathematics program were counted. Starting in 2005, no computer science courses were included in the CBMS survey of two-year mathematics programs, and starting in 2010, no computer science data were included in the survey of statistics departments.

Moreover, in fall 2010, the total course enrollments in public two-year college mathematics programs were 46% of the total mathematics and statistics enrollments of all the combined mathematical sciences programs (i.e. the two-year mathematics programs, four-year mathematics departments, and statistics departments combined).

Between 2005 and 2010, the nation's undergraduate statistics courses continued a trend of long-term enrollment growth in courses taught in mathematics departments of four-year and two-year colleges, as well as in statistics departments of four-year institutions. Some changes were made to the list of statistics courses in the CBMS 2010 survey questionnaires for four-year mathematics and the four-year statistics departments, following the suggestions of the CBMS steering committee representatives from the American Statistical Association (ASA). An elementary-level course (for non-majors) that had a calculus prerequisite was added to both instruments; it is possible that such courses existed in earlier surveys and that these enrollments were included in some departments' upper-level course enrollments, so that the growth in enrollments in elementary-level statistics courses, as well as the decline of enrollments in upper-level courses, may not be as great as the 2010 survey reports. Elementary statistics enrollments in four-year mathematics departments were up 56% in fall 2010 over fall 2005, and they have more than doubled since 1995; upper-level statistics enrollments in mathematics departments declined by roughly 2,000 students (a 6% decline) from fall 2005 to fall 2010. As has been noted, the addition of the new calculus-based elementary-level course (which contributed a non-distance-learning enrollment of roughly 23,000 students (see Table S.8)) may have contributed to the decline in upper-level statistics course enrollments in mathematics departments. Enrollments in introductory courses taught in statistics departments grew 50% from 2005 to 2010, and 65% from 1995 to 2010; upper-level statistics courses taught in statistics departments had an enrollment growth of 13% from 2005 to 2010, and 69% from 1995 to 2010. A number of changes were made to the four-year statistics department questionnaire, including changes to a couple of the upper-level courses, as well as the addition of the elementary-level course with a calculus prerequisite (see Table S.9 for non-distance-learning enrollments in all of the courses classified as elementary-level on the four-year statistics department

TABLE S.2 Total enrollment (in 1000s), including distance-learning enrollment, by course level in undergraduate mathematics, statistics, and computer science courses taught in mathematics and statistics departments at four-year colleges and universities, and in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010. (Beginning in 2005, two-year college data include only public two-year colleges and do not include any computer science. Beginning in 2010, statistics department data do not include computer science.)

	Mathematics Departments				Statistics Departments				Two-Year College Mathematics Programs			
Course level	1995	2000	2005	2010	1995	2000	2005	2010	1995	2000	2005	2010
Mathematics courses												
Precollege level	222	219	201	209	--	--	--	--	800	763	965	1150
Introductory level (including Precalculus)	613	723	706	863	--	--	--	--	295	274	321	368
Calculus level	538	570	587	748	--	--	--	--	129	106	108	138
Advanced level	96	102	112	150	--	--	--	--	0	0	0	0
Other (2-year)	--	--	--	--	--	--	--	--	160	130	187	231
Total Mathematics courses	1469	1614	1607	1971	--	--	--	--	1384	1273	1580	1887
Probability and Statistics courses												
Elementary level	115	136	148	231	49	54	54	81	72	74	117	137
Upper level	28	35	34	32	16	20	24	27	0	0	0	0
Total Probability and Statistics courses	143	171	182	262	65 [2]	74	78	108	72	74	117	137
Computer Science courses [1]												
Lower level	74	90	44	56	1	1	2	--	43	39	--	--
Middle level	13	17	8	12	0	0	0	--	0	0	--	--
Upper level	12	16	5	10	0	0	0	--	0	0	--	--
Total Computer Science courses [1]	99	123	57	77	1	1	2	--	43	39	--	--
Grand Total	1711	1908	1845	2310	66 [2]	75	80	108	1499	1386	1697	2024

Note: Round-off may make column totals seem inaccurate.

[1] Beginning in 1995, computer science enrollment included only courses taught in mathematics programs. Beginning in 2005, computer science courses were no longer included in the two-year college survey. Beginning in 2010, computer science courses were no longer included in the statistics survey.

[2] These totals were adjusted to remove certain mathematics enrollments included in statistics totals in 1995.

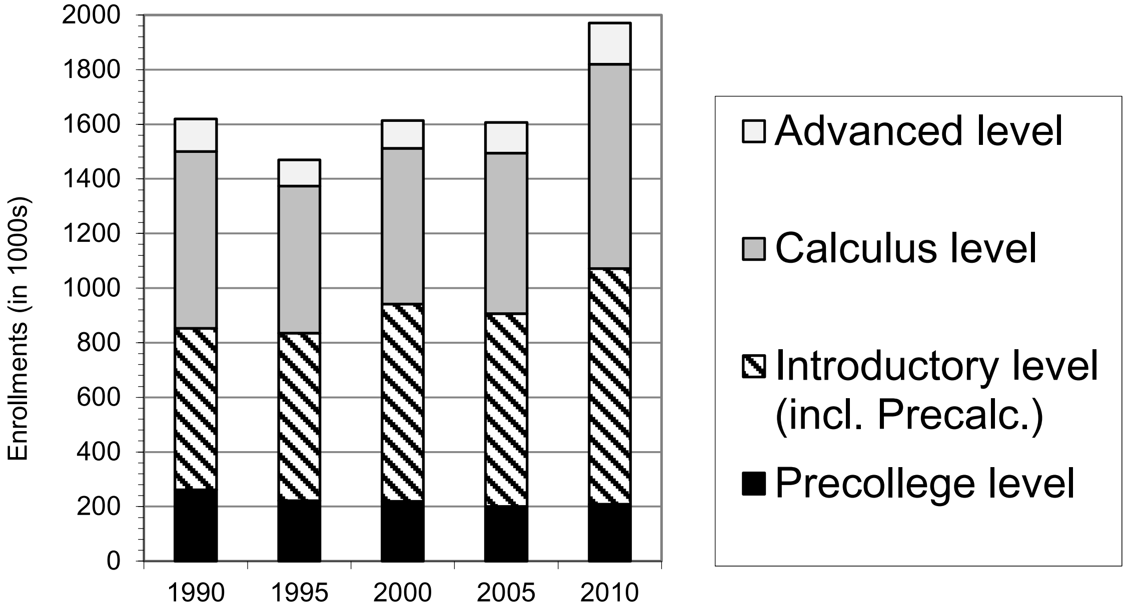

FIGURE S.2.1 Enrollments (in 1000s) in undergraduate mathematics courses in mathematics departments of four-year colleges and universities by level of course in fall of 1995, 2000, 2005, and 2010.

questionnaire). Statistics enrollments in courses taught in mathematics programs at two-year colleges were up 17% in 2010 over 2005, and they nearly doubled from 1995 to 2010. Elementary statistics enrollments in four-year mathematics departments were nearly three times greater than those in statistics departments, and elementary statistics enrollments in statistics departments were slightly less than 60% of those in two-year college mathematics programs.

Computer science enrollments have been declining within mathematics departments at four-year and two-year institutions, as well as in statistics departments. However, computer science enrollments in four-year mathematics departments, which had declined by a little more than 50% from fall 2000 to fall 2005, were up 35% from fall 2005 to fall 2010, though still 37% below the fall 2000 level. The CBMS surveys ceased collecting computer science enrollments in two-year college mathematics programs with the 2005 survey, and in statistics departments of four-year institutions with the 2010 survey. Although well below the levels of the previous decade, enrollments in computer science courses offered in mathematics departments are still a significant source of mathematical sciences enrollments.

Tables with finer breakdowns of enrollments in four-year mathematics and statistics departments (including breakdown by the level (bachelors, masters, doctoral) of the department) are found in Chapters 3 and 5, and individual course enrollments are presented in Appendix I. Additional details on mathematics and statistics course enrollments in two-year colleges are found in Chapter 6.

Academic year enrollments

CBMS surveys follow the NCES pattern and focus only on fall enrollments. However, CBMS surveys also have asked departments to provide the enrollment for the previous academic year, and for the fall term. Using this data, the ratio of full-year enrollment to fall enrollment can be estimated. In 1990, 1995, 2000, 2005, and 2010 these ratios were, respectively, 2, 2, 1.85 (SE=0.03), 1.75 (SE=0.03), and 1.8 (SE=0.04). As noted in the CBMS 2005 survey, this decline in the ratio is likely due to the decline in the quarter system (as shown in Table S.3 of CBMS2005; this data was not gathered in 2010).

Bachelors degrees in the mathematical sciences (Table S.3)

Table S.3 presents the total number of bachelors degrees awarded through the nation's four-year mathematics and statistics departments (combined) in the academic years 1989-1990, 1994-1995, 1999-2000, 2004-2005, and 2009-2010. As in past surveys, the survey instructions specified that double majors

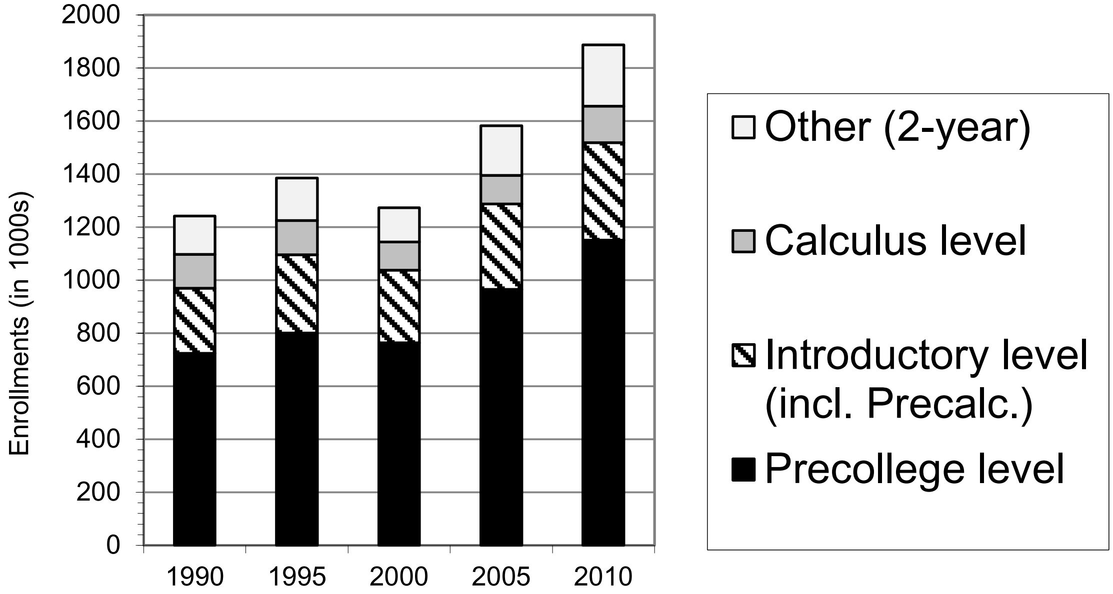

FIGURE S.2.2 Enrollments (in 1000s) in undergraduate mathematics courses in two-year college mathematics programs by level of course in the fall of 1990, 1995, 2000, 2005, and 2010.

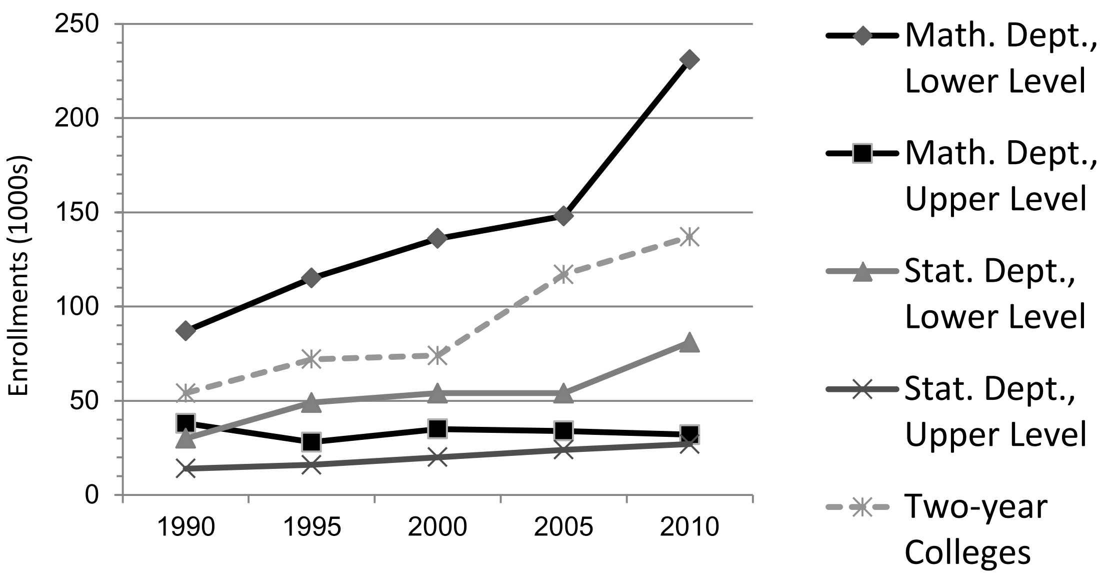

FIGURE S.2.3 Enrollments (in 1000s) in statistics courses in two-year college mathematics programs, and in mathematics departments and in statistics departments of four-year colleges and universities in fall 1990, 1995, 2000, 2005, 2010.

TABLE S.3 Combined total of all bachelors degrees in mathematics and statistics departments at four-year colleges and universities between July 1 and June 30 in 1989-90, 1994-95, 1999-2000, 2004-2005, and 2009-10 by selected majors and gender. The comparable table in CBMS2005 is S.4, p. 10.

Major	89-90	94-95	99-00	04-05	09-10
Mathematics (except as reported below)	13303	12456	10759	12316	12468
Mathematics Education	3116	4829	4991	3369	3614
Statistics (except Actuarial Science)	618	1031	502	527	856
Actuarial Mathematics	245	620	425	499	849
All Joint Majors (combined) [1]	--	--	--	--	1222
Joint Mathematics & Computer Science	960	453	876	719	--
Joint Mathematics & Statistics	124	188	196	203	--
Joint Math/Stat & Business or Economics	na	na	na	214	--
Other (includes Operations Research prior to 2010) [2]	1014	577	1550	985	231
Total Mathematics, Statistics & Joint degrees	19380	20154	19299	18833	19241
Number of women	8847	9061	9017	8192	8692
Computer Science degrees	5075	2741	3315	2603	2137
Number of women	1584	532	808	465	394
Total degrees	24455	22895	22614	21437	21377
Number of women	10431	9593	9825	8656	9086

Note: Round-off may make column totals seem inaccurate.

[1] Beginning in 2010, the survey asked for the total number of all joint majors.

[2] Prior to 2010, Operations Research was a separate category. Beginning in 2010, Operations Research is included in other Mathematics.

should be included in the count of degrees awarded. The degrees awarded are categorized as degrees in mathematics, mathematics education, statistics, computer science, actuarial mathematics, joint majors (to be defined below), or "other". Surveys of four-year mathematics departments conducted before 2010 contained the additional option of a major in operations research, and the numbers of operations research majors from those previous years have been added to the "other" category in Table S.3; furthermore, prior surveys broke down the category of joint majors into different subcategories, while the 2010 survey considered all joint majors as one category. Computer science degrees are counted only in mathematics departments. Table E.1 in Chapter 3 gives further breakdowns of the degrees awarded, including by the level (bachelors, masters, or doctoral) of the department awarding the undergraduate degree.

Table S.3 shows that the total number of bachelors degrees awarded by mathematics and statistics departments (combined) declined very slightly (less than 0.3%) between the 2004-2005 and the 2009-2010 academic years, and about 13% fewer bachelors degrees were awarded by mathematics and statistics departments in 2009-2010 than in 1989-1990. The table shows that the number of degrees given by mathematics and statistics departments in computer science has been declining; in 1989-1990 there were 5,075 degrees awarded, and in 2009-2010, this number had dropped to 2,137. It is likely that much of this decline is due to the creation of separate departments of computer science. If degrees in computer science are excluded from the count, then the number

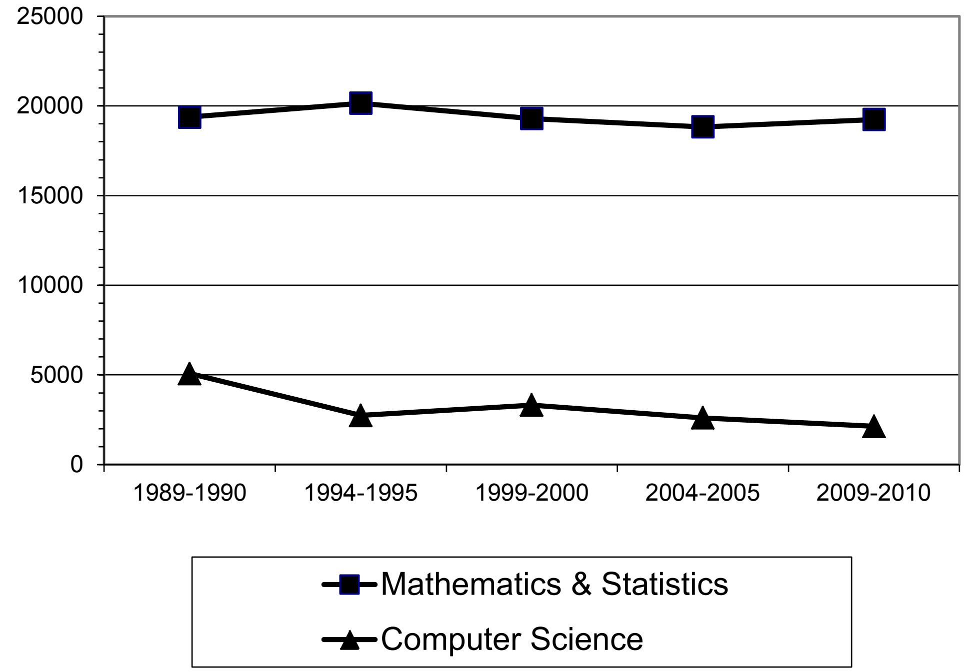

FIGURE S.3.1 Number of bachelors degrees in mathematics and statistics, and in computer science, granted through mathematics and statistics departments in academic years 1989-1990, 1994-1995, 1999-2000, 2004-2005, and 2009-2010.

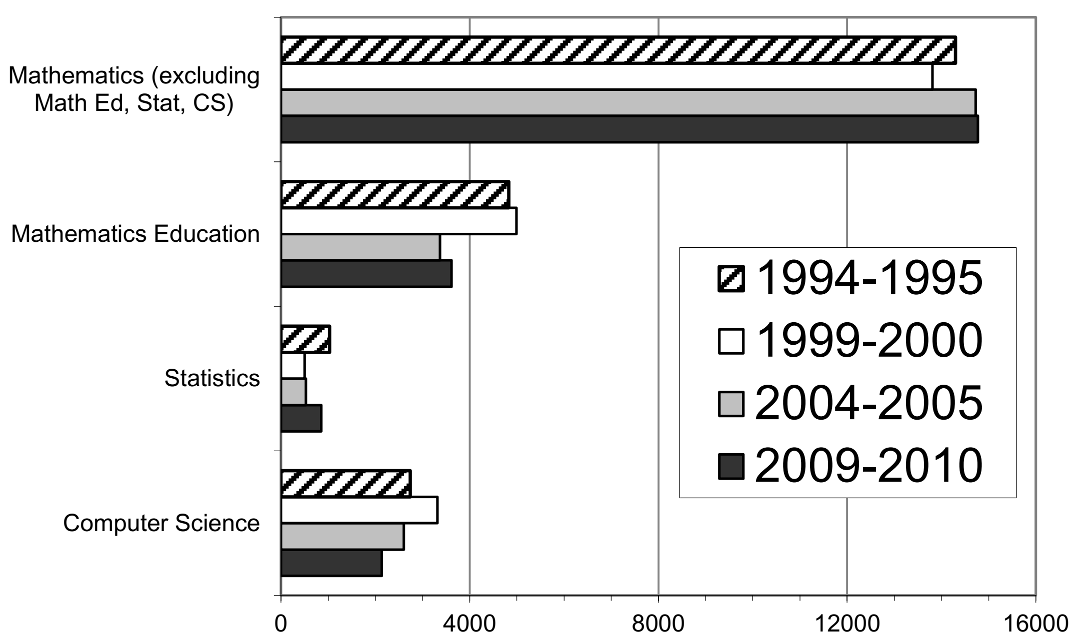

FIGURE S.3.2 Number of bachelors degrees awarded by mathematics and statistics departments (combined) at four-year colleges and universities between July 1 and June 30 in 1994-1995, 1999-2000, 2004-2005, and 2009-2010.

of bachelors degrees awarded in mathematics and statistics in 2009-2010 was 2% above the total in 2004-2005, and almost the same as in 1989-1990, and thus has remained relatively constant over the past twenty-five years (see Figure S.3.1). The standard error in the 2010 CBMS survey estimate of 19,241 degrees awarded in mathematics, statistics, and joint degrees in 2009-2010 is about 1,100 degrees.

Table S.3 and Figure S.3.2 show the breakdown of bachelors degrees awarded into the different categories of majors over the last three CBMS surveys. The number of degrees in mathematics education is up 7% from 2004-2005 to 2009-2010, but is still 28% below the 1999-2000 level. The number of degrees awarded in statistics has increased 62% since 2004-2005, and the number of degrees awarded in actuarial mathematics has increased even more, an astonishing 70% over 2004-2005 (however, the total number of actuarial science degrees remains quite small). The number of degrees awarded in computer science, while declining, is still a significant number, e.g. in 2009-2010 it is greater than the sum of degrees awarded in statistics and degrees awarded in actuarial mathematics.

The 2009-2010 Taulbee Survey ([CRA] available at http://cra.org/resources/taulbee/—click on "Past Survey Results"), an annual survey of doctoral-level computer science departments, published by the Computing Research Association, reports in its Table 11a that 7,836 undergraduate degrees in computer science were awarded by U.S. doctoral-level computer science departments in 2009-2010 (11,204 when degrees in computer engineering and information are added). Table 9a of that report shows that of the 8,838 U.S. and Canadian citizens who were awarded undergraduate degrees in computer science in 2009-2010 by doctoral computer science departments, and for whom the gender is known, 14% of the degree recipients were women (13% when computer engineering and information are added). These statistics on bachelors degrees produced by only doctoral-level computer science departments can be compared to CBMS data on computer science bachelors degrees awarded by mathematics departments. The 2,137 degrees in computer science awarded by mathematics departments in 2009-2010 are equivalent to 27% of the 7,836 computer science degree recipients produced by doctoral-level computer science departments in 2009-2010, so they are a significant contribution to the nation's computer scientists. Moreover, women comprised 18% of the computer science bachelors degrees awarded from mathematics departments in 2009-2010, as opposed to the 14% of bachelors degrees awarded to women that was reported for doctoral-level computer science departments in 2009-2010. When, in Chapter 3, Table E.1, the computer science degrees produced by mathematics departments are broken down by the level of department awarding the degree, it will be evident that in 2009-2010 these computer science degrees were given most frequently by the bachelors-level mathematics departments.

The CBMS 2010 survey defined a "joint major" as "a student who completes a single major in your department that integrates courses from mathematics and some other program or department and typically requires fewer credit hours than is the sum of the credit hours required by the separate majors". "Double majors", students who complete two separate majors, were counted in the CBMS survey according to the category of mathematics or statistics major they complete. The CBMS 2010 survey grouped all joint mathematics majors into one category of "joint majors", rather than breaking them down into possible kinds of joint majors, which had been the past CBMS survey practice. In 2010, the category of joint majors was 8% higher than the sum of the individual kinds of joint majors described in the 2005 survey. The category of degrees in "other" areas dropped to almost one-quarter of its 2004-2005 level; one can only speculate about what "other" might include – possibly operations research or some other kind of degree in statistics.

Table S.3 also shows that the percentage of bachelors degrees awarded to women through U.S. mathematics and statistics departments rose from 40.4% in 2004-2005 to 42.5% in 2009-2010 (it was 43.4% in 1999-2000). If computer science degrees are excluded, then the percentage of degrees awarded to women through U.S. mathematics and statistics departments rose from 43.5% in 2004-2005 to 45.2% in 2009-2010 (it was 46.7% in 1999-2000). Table E.1 in Chapter 3 shows that these percentages vary across levels of mathematics and statistics departments.

NCES also provides data on the numbers of degrees awarded [NCES2] (available at http://nces.ed.gov/programs/digest/d11/tables/dt11_327.asp); these data come from the IPEDS data submitted by a college or university office, while the CBMS survey data come from the department chairs. The NCES data and the CBMS data are not identical. For example, IPEDS reported 16,030 undergraduate degrees awarded in mathematics and statistics during the 2009-2010 academic year, while CBMS2010 reported 19,241 degrees (Table S.3). Unlike the CBMS data, the NCES data do not always include double majors or mathematics education majors, and the NCES data do not include computer science majors given in a mathematics department in the totals of mathematics degrees awarded. NCES data is census data, while CBMS data are estimates based upon a stratified random sample. NCES data showed an increase of 1,679 degrees (12%) from the 2004-2005 academic year to the 2009-2010 academic year, while CBMS2010 data showed an increase of 408 degrees, though some of the change observed in the NCES data may be due to changing practices regarding the reporting of double and joint majors.

Appointment type of instructors in undergraduate mathematics and statistics courses (Tables S.4 through S.9)

CBMS2010 Tables S.4 through S.9 provide information about who was teaching undergraduate mathematics and statistics courses in four-year and two-year colleges and universities. For the CBMS 2010 survey, faculty at four-year institutions were broken into four categories: tenured, tenure-eligible, and permanent faculty (TTE), other full-time faculty (OFT) who were full-time but not TTE, part-time faculty, and graduate teaching assistants (GTAs). A course was to be reported as being taught by a GTA if and only if the GTA was the "instructor of record" for the course. GTAs who ran discussion or recitation sections as part of a lecture/recitation course were not included in this category. For two-year colleges, which typically do not have a tenure system, faculty were classified as full-time faculty or part-time faculty. These tables are broken down further, by courses and by the level of the department, in tables in Chapters 3, 5, and 6.

In past CBMS surveys, the TTE category was labeled "tenured/ tenure-eligible" on the survey questionnaire, without the word "permanent", but the instructions for the questionnaire told departments at institutions that did not recognize tenure (12% of all four-year mathematics departments in the CBMS 2010 survey and 5% in 2005) to place permanent faculty in the TTE category. In the 2010 survey the label "permanent" was added to the description of the TTE category on the questionnaire, and this change may have added to the TTE category other instructors who had teaching positions that were regarded as permanent, although these faculty did not have tenure and were not eligible for tenure, even if their institution recognized tenure. The instructions did not define "permanent" beyond the situation where the institution did not recognize tenure, but it seems quite possible that some depart-

TABLE S.4 Percentage of sections (excluding distance-learning and dual-enrollment sections) in various types of courses taught by different types of instructors in mathematics and statistics departments of four-year colleges and universities, and percentage of sections taught by full-time and part-time faculty in mathematics programs of public two-year colleges, in fall 2010. Also total enrollments (in 1000s), excluding distance-learning and dual-enrollment enrollments. The comparable table in CBMS2005 is S.5, p. 13.

	Percentage of sections taught by					
Four-Year College & University	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Total enrollment in 1000s
Mathematics Departments						
Mathematics courses 2010	47	16	20	6	11	1928
Statistics courses 2010	60	9	14	3	13	250
Computer Science courses 2010	60	17	21	1	2	73
All mathematics department courses 2010	49	15	19	6	11	2251
Statistics Departments						
All statistics department courses 2010	49	11	8	10	22	105
Two-Year College Mathematics Programs	Full- time		Part- time			Enrollment in 1000s
All TYC mathematics program courses 2010	54	--	46	--	--	1836

Sums of percentages across rows do not always total 100% due to rounding.

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010. (See discussion of Tables S.4 - S.9.)

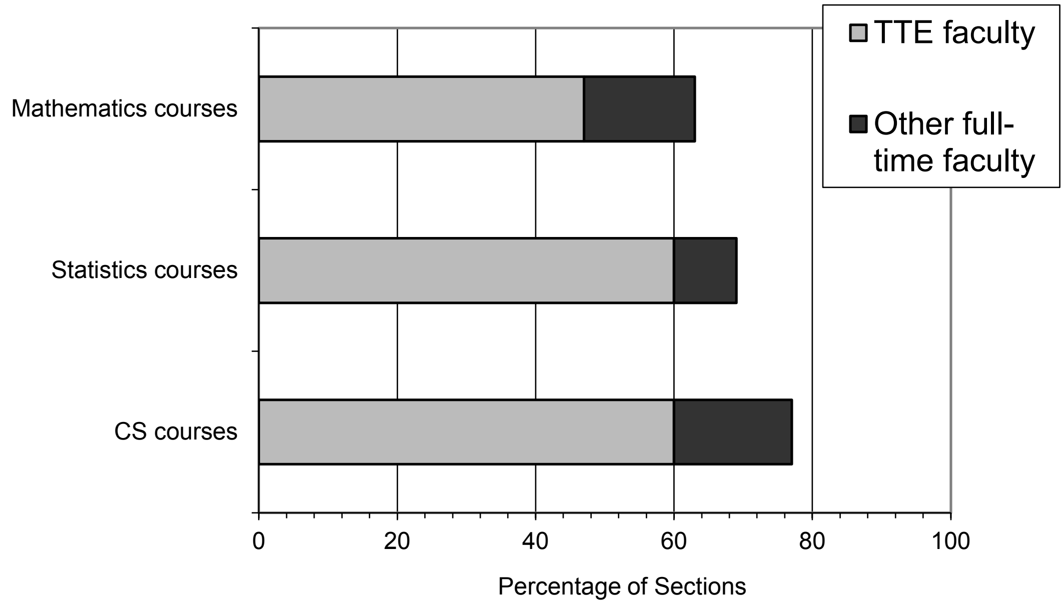

FIGURE S.4.1 Percentage of sections in four-year college and university mathematics departments taught by tenured/tenure-eligible/permanent (TTE) faculty and by other full-time (OFT) faculty in fall 2010, by type of course. Deficits from 100% represent courses taught by part-time faculty, graduate teaching assistants, and unknown faculty.

ments interpreted "permanent faculty" to have this additional meaning, and some of the data suggest that this was the case. Hence, the addition of the word "permanent" may mean that in 2010, faculty who might be classified as "teaching faculty", who had renewable contracts, but were not tenured or tenure-eligible, may have been added to the TTE category, even if the institution recognized tenure. As a consequence of this change, in 2010 the other full-time (OFT) category may consist primarily of postdocs and other temporary academic visitors.

The 2010 CBMS survey followed the practice established in the 2005 survey of presenting findings in terms of percentages of "sections" offered. In analyzing the 2010 survey data, it seemed that the notion of "section" varied somewhat among different departments, particularly for lower-level classes that may be taught with a laboratory component. A further, and possibly related, problem experienced in the 2010 survey was the inconsistent numbers of faculty and sections reported by some departments; this problem had occurred in past surveys and was resolved by creating the category of "unknown" instructors. The percentage of "unknown" faculty in the 2010 CBMS survey was generally higher than in past surveys, making it difficult to draw conclusions about changes in the percentages of the various ranks of instructors teaching specific courses. When comparing data from the CBMS 2000 and earlier surveys, one must keep in mind the change made in 2005. In some cases the CBMS 2000 and earlier surveys presented data on who taught the course in terms of percentages of enrollments, rather than percentages of sections.

Table S.4 gives a macroscopic view of the faculty who taught undergraduate courses in mathematics and statistics departments of four-year colleges and universities and in the mathematics programs at two-year colleges in the fall of 2010. Chapter 3, Table E.5 breaks down the data on four-year departments in Table S.4 by the level (bachelors, masters, doctoral) of the mathematics and statistics department, revealing important trends in the data. Table S.4 shows that slightly fewer than half (49%) of the sections of all courses offered in mathematics departments of four-year colleges and universities in fall 2010 were taught by tenured, tenure-eligible, or permanent faculty, up slightly from the 48% reported in fall 2005. As we have noted, the word "permanent" was not included in the 2005 survey, and the percentage of unknown instructors rose from 5% in 2005 to 11% in 2010, both factors qualifying any conclusions that are drawn from the data. However, it is likely that increases in percentages indicate some increase in that category, though it may be that the additional faculty counted in the TTE category in 2010 were permanent faculty who were counted as other full-time faculty in 2005, and hence, even with an increasing percentage, there may be no real change in TTE faculty from 2005 to 2010.

TABLE S.5 Percentage of fall 2010 sections (excluding distance-learning sections) in courses of various types taught in mathematics and statistics departments of colleges and universities by various types of instructors, and percentage of sections taught by full-time and part-time faculty in mathematics programs at public two-year colleges in fall 2010, with data for fall 2005 from CBMS2005 Table S.6 and data for fall 2000 from CBMS2000 Tables E12 to E18. Also total enrollments (in 1000s).

	Percentage of sections taught by					
Four-Year Colleges & Universities	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Total enrollment in 1000s
Mathematics Department courses						
Mathematics courses						
Precollege level 2010	18	20	44	9	9	201
Precollege level 2005	9	25	46	14	5	199
Precollege level 2000	20	18	43	10	10	219
Introductory level 2010	32	22	27	8	10	834
Introductory level 2005	31	25	28	10	6	695
Introductory level 2000	35	21	28	10	6	723
Calculus level 2010	59	15	12	7	8	743
Calculus level 2005	61	17	9	7	6	583
Calculus level 2000	64	14	10	6	5	570
Upper level 2010	78*				23*	150
Upper level 2005	84*				16*	112
Statistics courses						
Elementary level 2010	48	14	22	4	12	218
Elementary level 2005	49	16	28	3	3	145
Elementary level 2000	47	16	24	5	8	136
Upper level 2010 sections	77*				23*	32
Upper level 2005 sections	59*				41*	34
Computer Science courses						
Lower level 2010	50	17	29	1	3	52
Lower level 2005	63	12	17	1	8	43
Lower level 2000	42	19	28	0	11	90
Statistics Department Courses						
Elementary level 2010	33	17	12	15	23	81
Elementary level 2005	25	21	13	20	21	53
Elementary level 2000	27	14	20	29	10	54
Upper level 2010	79*				21*	27
Upper level 2005	74*				26*	23
Two-Year College Mathematics Programs	Full-time		Part-time			
All 2010 sections	54		46			1836
All 2005 sections	56		44			1616
All 2000 sections	54		46			1347

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010.

* Beginning in 2005, the CBMS survey asked departments to specify the number of upper-division sections and the number taught by tenured and tenure-eligible faculty. The deficit from 100% is reported as "unknown."

Some rows do not sum to 100% due to round-off. Note: zero means less than one-half of one percent.

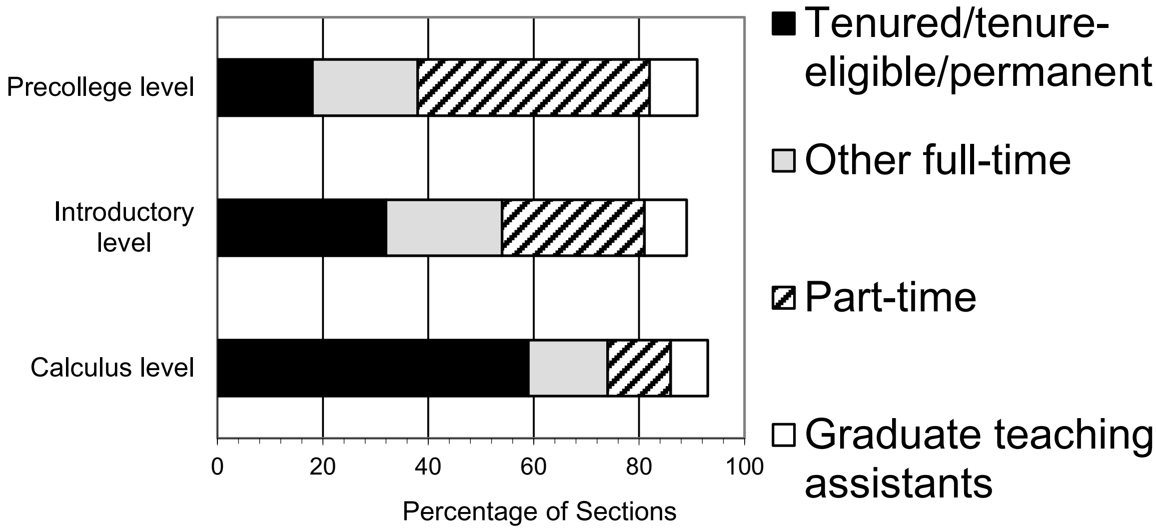

FIGURE S.5.1 Percentage of sections in lower-division undergraduate mathematics courses in mathematics departments at four-year colleges and universities by level of course and type of instructor in fall 2010. Deficits from 100% represent unknown instructors.

Table S.5 presents the percentages of sections taught by faculty of the various appointment types, broken down by the level of the courses, and includes the history from the past three surveys for courses offered in four-year mathematics and statistics departments, and in public two-year college mathematics programs. Mathematics courses at four-year departments were divided into the four categories of precollege-level, introductory-level, calculus-level, and upper-level (upper-level percentages were not gathered in the 2000 survey, and when gathered in 2005 and 2010 they have been broken into only the TTE and unknown categories). Statistics courses were classified as either elementary-level or upper-level, and only the lower-level computer science courses taught in mathematics departments are presented in Table S.5. Total enrollments (without distance-learning enrollments) for each of these course categories are also given. Chapter 3, Tables E.6-E.12 give the number of sections of precollege-level mathematics, introductory-level mathematics, calculus-level mathematics, elementary statistics, lower-level computer science, middle-level computer science, and advanced-level mathematics and statistics courses (respectively) taught by each rank of faculty, broken down by the level (bachelors, masters, doctoral) of the mathematics department in fall 2010. Tables E.9 and E.12 also present this data for elementary-level and advanced-level statistics courses taught in statistics departments, broken down by the level (masters or doctoral) of the statistics department. Further detail for courses taken by beginning students at four-year colleges and universities is given in Chapter 5, Tables FY.1, FY.3, FY.5, FY.6, and FY.9. Chapter 6, Table TYE.9 presents the number of sections and percentage of sections taught by part-time faculty in public two-year colleges in fall 2010 broken down by specific courses.

Table S.5 shows an increase in the percentage of sections of courses at the precollege-level and introductory-level taught by TTE mathematics faculty and a declining number of these sections taught by other full-time mathematics faculty; it is likely that mathematics courses at these lower levels might be taught by faculty who are permanent “teaching faculty”, who were not tenured or tenure-eligible, supporting the notion that some of the growth in the TTE percentages is due to the inclusion of the word “permanent” in the description of these faculty. More detail on who taught specific introductory-level mathematics courses at the various levels of departments is contained in Chapter 5, Table FY.1.

Figure S.4.1 displays the percentages of sections taught by TTE and OFT faculty in mathematics departments in four-year colleges and universities, broken down by the subject areas of mathematics courses, statistics courses, and computer science courses. It is interesting to note that, as was the case in fall 2005, as shown in Figure S.4.1, the percentage of sections of statistics and computer science courses taught by TTE faculty in four-year mathematics departments was higher than for mathematics courses, though Table S.5 shows that the percentage of TTE faculty in calculus-level courses was nearly 60%, equal to the overall percentage for statistics and computer science courses. Figure S.5.1 displays the percentages of precollege-level, introductory-level, and calculus-level mathematics classes taught by the various ranks of instructors, and, not surprisingly, shows that the percentage of TTE faculty rose as the course level rose.

There has been some concern in previous CBMS studies, as well as in studies made by the American Mathematical Society [LM], about the apparently growing use of part-time instructors in four-year mathematics departments. Table S.4 shows that in fall 2010, within mathematics departments at four-year institutions, the percentage of sections of mathematics courses taught by part-time faculty remained at 20%, as it was in 2005, the percentage of sections of statistics courses taught by part-time mathematics faculty decreased from 19% in 2005 to 14% in 2010, and the percentage of sections of computer science courses taught by part-time faculty almost doubled (increasing from 11% in 2005 to 21% in 2010), perhaps to compensate for the increased enrollment in computer science courses taught in mathematics departments that was noted earlier. From Table S.5 we see that the percentage of part-time instructors is highest for precollege-level courses (44%) and is only 12% for calculus-level courses. When faculty demographics are discussed later in this chapter, we will note that the number of part-time faculty declined 7% from fall 2005 to 2010 (see Table S.14).

According to Table S.4, in the statistics departments of four-year colleges and universities, the percentage of unknown instructors rose from 13% in 2005 to 22% in 2010, and the percentages of the various ranks of faculty teaching statistics courses were about the same, except for the other full-time category, which decreased from 23% to 11%. It is interesting to note that the percentage of sections taught by part-time instructors in four-year statistics departments was less than half that in mathematics departments, a trend that held in 2005, as well. The percentage of sections in two-year college mathematics programs taught by full-time faculty decreased from 56% in fall 2005 to 54% in fall 2010, returning to the fall 2000 level (see Table TYE.9).

Calculus courses are important for the mathematics major as well as for many other STEM (science, technology, engineering, and mathematics) majors, and hence CBMS surveys have paid particular attention to calculus courses. The 2010 survey made the same simplifying assumptions about calculus courses that were made in recent CBMS surveys. First, the CBMS survey divided all calculus courses into two components: "Mainstream Calculus" and "Non-Mainstream Calculus". "Mainstream Calculus" consists of the calculus courses that are prerequisites for upper-level mathematics courses as well as courses required in the physical sciences and in engineering, while "Non-Mainstream Calculus" means all of the other calculus courses (often with titles such as "Calculus for Business and Social Science" or "Calculus for the Life Sciences"). The second assumption made in the recent CBMS surveys of four-year mathematics departments is that calculus (and also elementary statistics) courses are generally taught either in large lecture sections that are broken into smaller recitation, discussion, or laboratory sections (typically with a graduate teaching assistant leading these sections) or in "regular classes" that always meet with the same instructor and students. CBMS surveys have further divided "regular classes" into those with enrollments of 30 or less, and those with larger enrollments (the number 30 was chosen because it was the maximum section size recommended by the Mathematical Association of America [MAA Guidelines]). The CBMS four-year mathematics questionnaire asks departments for enrollments, number of sections, and ranks of instructors for each of these three typical modes of instruction. The data showed that in 2010 there were other kinds of arrangements and/or the survey instructions were too complicated to follow, a situation that became particularly evident from data from departments reporting a smaller total number of recitation sections than lecture sections and/or the number of instructors reported bore little relation to the number of sections reported. With the creation of mathematics tutoring centers, perhaps recitation sections are becoming less necessary, and required calculus lab assignments may not always be completed in a "section" of a course, so sometimes there actually were fewer recitation sections than lecture sections. With some follow-up correspondence with a number of departments, the survey directors did their best to fit the data into our calculus course structure.

Table S.6 presents the percentages of the various rank instructors for Mainstream Calculus I and II for each of the three kinds of section structures: large lecture/recitation sections, regular sections of size less than or equal to 30, and regular sections of size larger than 30, in mathematics departments of four-year colleges and universities in fall 2010. This table also gives the total enrollment and average section size for each of these three kinds of sections in calculus courses in four-year mathematics departments, not including any distance-learning sections. It presents some comparison data from the 2000 and 2005 CBMS surveys. Chapter 5, Table FY.3 breaks these percentages down by the level of department, revealing further trends in Mainstream Calculus instruction. Figure S.6.1 displays the percentages of the various ranks of instructors for the three kinds of sections of Mainstream Calculus I in four-year mathematics departments. Table S.6 gives further data, including the percentage of sections of Mainstream Calculus I and II taught by full-time faculty in public two-year colleges as well as the total enrollments and the average section sizes. Table S.7 gives the analogous percentages for Non-Mainstream Calculus I and II,

TABLE S.6 Percentage of fall 2010 sections in Mainstream Calculus I and II (not including distance-learning sections) taught by various kinds of instructors in mathematics departments at four-year colleges and universities by size of sections with fall 2005 data from CBMS2005 Table S.7. Percentage of sections taught by full-time and part-time faculty in mathematics programs at public two-year colleges in fall 2005 and 2010. Also total enrollments (in 1000s) and average section sizes.

	Percentage of sections taught by						
Four-Year Colleges & Universities	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Un-known %	Enroll-ment in 1000s	Average section size
Mainstream Calculus I							
Large lecture/recitation	46	19	20	9	7	107	50
Regular section <31	65	18	11	3	4	49	21
Regular section >30	48	16	14	9	12	78	36
Course total 2010	**53**	**18**	**15**	**7**	**8**	**234**	**35**
Course total 2005	63	17	7	8	5	201	32
Mainstream Calculus II							
Large lecture/recitation	50	15	27	4	4	61	51
Regular section <31	76	9	5	4	6	22	19
Regular section >30	52	17	5	13	13	45	37
Course total 2010	**59**	**14**	**12**	**7**	**8**	**128**	**36**
Course total 2005	66	15	6	8	5	85	33
Total Mainstream Calculus I & II 2010	**55**	**16**	**14**	**7**	**8**	**362**	**35**
Total Mainstream Calculus I & II 2005	64	16	7	8	5	286	32
Two-Year Colleges	Full-time %		Part-time %				
Mainstream Calculus I 2010	**90**		**10**			**63**	**20**
Mainstream Calculus I 2005	88		12			49	22
Mainstream Calculus II 2010	**86**		**14**			**29**	**24**
Mainstream Calculus II 2005	87		13			19	18
Total Mainstream Calculus I & II 2010	**89**		**11**			**93**	**21**
Total Mainstream Calculus I & II 2005	87		13			68	21

Percentage sums across rows may differ from 100% due to round-off.

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010.

and Chapter 5, Table FY.5 breaks these percentages down by the level of department for four-year mathematics departments.

From Table S.6 we see that the percentage of sections of Mainstream Calculus I taught by TTE faculty decreased from 63% in 2005 to 53% in 2010 (recall the possible addition of permanent faculty to TTE in 2010 and, here, 8% unknown faculty), and the percentage of sections taught by part-time faculty more than doubled, from 7% in 2005 to 15% in 2010. The type of section with the largest percentage of sections taught by TTE faculty was the regular sections with 30 or fewer students. The average size of Mainstream Calculus I sections increased from 32

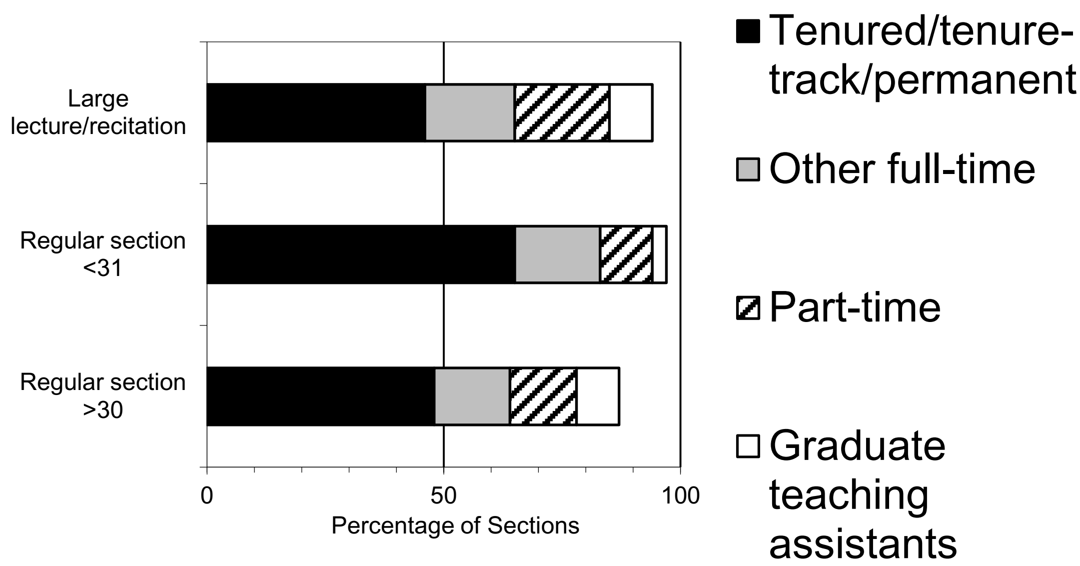

FIGURE S.6.1 Percentage of sections in Mainstream Calculus I taught by tenured/tenure-eligible/permanent, other full-time, part-time, and graduate teaching assistants in mathematics departments at four-year colleges and universities by size of sections in fall 2010. Deficits from 100% represent unknown instructors.

students in 2005 to 35 students in 2010. Looking at the three different kinds of sections of Mainstream Calculus I, we see that enrollments in the large lecture/recitation sections and enrollments in regular sections with more than 30 students both increased from 2005 to 2010, while the enrollment in regular sections with 30 or fewer students declined. Notice that Mainstream Calculus I enrollment increased from 201,000 in 2005 to 234,000 in 2010, an increase of 16%. Similar trends occurred in Mainstream Calculus II, where the percentage of sections taught by TTE faculty decreased from 64% in 2005 to 55% in 2010, the percentage of sections taught by part-time faculty doubled, from 6% in 2005 to 12% in 2010, and the enrollment both in large lecture/recitation sections and in regular sections with more than 30 students increased from 2005 to 2010, while the enrollment in regular sections with 30 or fewer students declined. Enrollment in Mainstream Calculus II grew faster than Mainstream Calculus I (perhaps due to increasing numbers of students taking Calculus I in high school) with Mainstream Calculus II enrollments rising 51% in 2010 over 2005. As calculus enrollments are up and the number of TTE faculty is down (Table S.14), it is not surprising that a smaller percentage of Mainstream Calculus sections are taught by TTE faculty, and that Mainstream Calculus average section size is rising.

In public two-year colleges, Table S.6 shows that the percentage of sections of Mainstream Calculus I taught by full-time faculty increased from 88% in 2005 to 90% in 2010, and the average section size decreased from 22 students in 2005 to 20 students in 2010. In Mainstream Calculus II at two-year colleges, the percentage of sections taught by full-time faculty decreased from 87% in 2005 to 86% in 2010, and the average section size increased from 18 students in 2005 to 24 students in 2010 (see Tables TYE.8 and TYE.9 in Chapter 6).

Table S.7 presents analogous data for all levels of Non-Mainstream Calculus (combined). First note that the percentage of TTE faculty teaching Non-Mainstream Calculus I was 31%, a little more than half the percentage of TTE faculty teaching Mainstream Calculus I, and the percentage of part-time faculty teaching Non-Mainstream Calculus I was 23%, compared to 15% for Mainstream Calculus I. For Non-Mainstream Calculus II and above, the CBMS questionnaire asked only about the course, without distinguishing the three possible section structures that were used for the other calculus sections. Analysis of the data for Non-Mainstream Calculus II and above is complicated by an error in the four-year mathematics department questionnaire. The entry that followed Non-Mainstream Calculus I in the four-year mathematics department questionnaire should have read: “Non-Mainstream Calculus II, III, etc.”, but said instead: “Non-Mainstream Calculus I, II, III, etc.”. While the instructions indicated that a course should be entered only once, some data for this entry

TABLE S.7 Percentage of sections in Non-Mainstream Calculus I and II, III, etc. taught by various kinds of instructors in mathematics departments at four-year colleges and universities by size of sections, and percentage of sections taught by full-time and part-time faculty in mathematics programs at public two-year colleges in fall 2010. Also total enrollments (in 1000s) and average section sizes. Distance-learning sections are not included. (For four-year colleges and universities, data in parentheses show percentage of enrollments in 2000, percentage of sections in 2005.) The comparable table in CBMS2005 is S.8, p. 19.

	Percentage of sections taught by						
Four-Year Colleges & Universities	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Un-known %	Enroll-ment in 1000s	Average section size
Non-Mainstream Calculus I							
Large lecture/recitation	35	30	20	9	7	34	56
Regular section <31	33	18	23	15	11	17	24
Regular section >30	27	24	24	11	14	48	45
Course total 2010	31	24	23	12	11	99	42
(2000, 2005) [2]	(44,35)	(21,23)	(19,21)	(12,13)	(4,9)	(105,108)	(40,37)
Non-Mainstream Calculus II, III, etc. [3]							
Course total 2010	34	15	17	11	22	22	29
(2000, 2005) [2]	(53,33)	(10,26)	(22,23)	(15,17)	(1,1)	(10,10)	(40,46)
Total Non-Mnstrm Calculus I & II, III, etc.	31	22	21	12	14	121	39
(2000, 2005) [2]	(44,35)	(20,23)	(19,21)	(12,13)	(5,8)	(115,118)	(40,38)
Two-Year Colleges	Full-time %		Part-time %				
Non-Mainstream Calculus I	75		25			19	21
(2000, 2005)	(74,73)		(26,27)			(16,20)	(22,23)
Non-Mainstream Calculus II	50		50			2	27
(2000, 2005)	(92,66)		(8,34)			(1,1)	(20,21)
Total Non-Mnstrm Calculus I & II	73		27			21	21
(2000, 2005)	(76,72)		(24,28)			(17,21)	(22,23)

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010.

[2] For four-year colleges and universities, data in parentheses show percentage of enrollments in 2000, of sections in 2005.

[3] The 2010 survey asked for "Non-Mainstream Cal I, II, and III, etc". -- the data here are our best estimate for Calculus II, III, etc. Previous surveys asked only for Non-Mainstream Calculus II.

Sums of percentages across rows may differ from 100% due to round-off.

included data for Non-Mainstream Calculus I. Using the additional data on faculty, and with some follow-up correspondence to some departments, the survey directors interpreted the data as best they could. With that caveat, the percentage of TTE faculty teaching Non-Mainstream Calculus II, III, etc. increased from 2005 to 2010 (but with 22% unknown instructors in 2010), the enrollment more than doubled over 2005 (note that it included Non-Mainstream Calculus III, etc. in 2010 but not in 2000 or 2005), and the average section size in 2010 was about two-thirds of what it was in 2000 or 2005.

TABLE S.8 Percentage of sections in elementary probability and statistics courses taught by various types of instructors in mathematics departments at four-year colleges and universities by size of sections, and percentage of sections taught by full-time and part-time faculty in mathematics programs at public two-year colleges in fall 2010; comparable data for (2000, 2005) when available. Also total enrollments (in 1000s) and average section sizes. Distance-learning enrollments are not included. (For four-year colleges and universities, data in parentheses show percentage of enrollments in 2000, percentage of sections in 2005.) The comparable table in CBMS2005 is S.9, p. 20.

	Percentage of sections taught by						
Four-Year Colleges & Universities Mathematics Departments	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Un-known %	Enroll-ment in 1000s	Average section size
Introductory Statistics (F1) [4] (no calculus prerequisite) [3]							
Large lecture/recitation	46	6	27	2	19	47	33
Regular section <31	46	17	26	2	9	54	22
Regular section >30	46	18	17	8	12	74	45
Course total (F1)	46	15	24	4	12	174	31
(2000, 2005) [2]	(45,51)	(13,16)	(24,27)	(7,3)	(11,4)	(114,122)	(42,31)
Introductory Statistics (F2) (calculus prerequisite) (not for majors)							
Large lecture/recitation	59	21	8	2	9	8	25
Regular section <31	70	8	12	3	7	6	15
Regular section >30	49	23	10	19	0	9	38
Course total (F2)	61	16	10	7	6	23	24
Probability & Statistics (F3) (no calculus prerequisite)							
Course total (F3)	41	8	26	9	16	18	32
(2000, 2005) [2]	(50,29)	(28,24)	(23,44)	(0,1)	(0,2)	(13,18)	(25,30)
Other elementary level Probability & Statistics courses (F4)							
Course total (F4)	71	12	0	6	12	3	27
Total All Elem. Probability & Statistics courses							
Course total (F1+F2+F3+F4)	48	14	22	4	12	218	30
(F1 + F3 totals, 2000, 2005) [2]	(46,48)	(14,17)	(24,29)	(6,3)	(10,3)	(127,140)	(25,31)
Two-Year Colleges	Full-time %		Part-time %				
Total All Elementary Probability and Statistics Courses	61		39			114	28
(2000, 2005)	(66,65)		(34,35)			(71,101)	(25,26)

[1] Before 2010, the category was "tenured/tenure-eligible"; the word "permanent" was added in 2010.

[2] For four-year colleges and universities, data in parentheses show percentage of enrollments in 2000, of sections in 2005.

[3] This course was called "Elementary Statistics" in previous CBMS surveys.

[4] F1 is the statistics course number on the four-year mathematics survey form.

Sums of percentages across rows may differ from 100% due to round-off. Note: 0 means less than one half of 1%.

In public two-year college mathematics programs, Non-Mainstream Calculus I enrollment was down slightly, approximately 1000 students (5%), in 2010 over 2005. Furthermore, the average class size was also down slightly to 21 students, and the percentage of sections taught by full-time faculty was up from 73% in 2005 to 75% in 2010. Non-Mainstream Calculus II enrollment doubled in 2010 over 2005 at two-year mathematics programs, growing from about 1,000 in 2005 to 2,000 in 2010. Average class size grew to 27, and the percentage of full-time faculty teaching it dropped from 66% in 2005 to 50% in 2010.

Elementary statistics courses are becoming important courses in mathematics and statistics departments. Their enrollments have been growing, and there is increased interest in who is teaching them and how they are taught. The data in Table S.8, regarding the courses taught in mathematics departments in four-year colleges and universities, and in two-year college mathematics programs, are considered first; next, in Table S.9, data regarding elementary statistics courses taught in statistics departments are considered.

Past CBMS surveys have studied two elementary-level statistics courses taught in mathematics departments of four-year colleges and universities, both with no calculus prerequisite: one was called "Elementary Statistics", broken down into the section structure used in gathering calculus course data, and the other course was called "Probability and Statistics", which was not broken down by section structure. In the 2010 survey, the name of the first course was changed to "Introductory Statistics", and the level was called "Introductory Level". In fall 2010, Table S.8 shows that Introductory Statistics had a total (non-distance learning) enrollment of 174,000, up 43% from fall 2005. This enrollment put Introductory Statistics enrollments almost midway between Mainstream Calculus I enrollments of 234,000 and Mainstream Calculus II enrollments of 128,000. When the "Probability and Statistics" (non-distance learning) fall 2010 enrollment of 18,000 (the same as the 2005 enrollment) is added to the Introductory Statistics enrollment, there is a total enrollment of 192,000 students in non-calculus probability and statistics courses in four-year mathematics departments in fall 2010 (up 37% from 2005). Following a request from the American Statistical Association (ASA) members of the CBMS2010 survey steering committee, the 2010 CBMS survey also inquired about other introductory probability and statistics courses, including introductory statistics courses with a calculus prerequisite. Given the growing number of students who take calculus in high school, there should be a growing market for an introductory statistics course that makes use of calculus. A course with this description had not been included in previous CBMS surveys. This new introductory-level course, "Introductory Statistics (calculus prerequisite) (for non-majors)", was broken down by the same three section structures used for calculus classes and for "Introductory Statistics (no calculus prerequisite)". As shown in Table S.8, the introductory statistics course with a calculus prerequisite enrolled roughly an additional 23,000 students, and with "other elementary probability and statistics courses" added in, the total of all introductory probability and statistics enrollment in four-year mathematics departments in fall 2010 was 218,000 students.

Table S.8 shows that in four-year mathematics departments in fall 2010, 48% of the sections of all the introductory probability and statistics courses combined were taught by TTE faculty (the same percentage as in 2005), and 22% of the sections were taught by part-time faculty (down from 29% in 2005); the average section size was 30 (it was 31 in 2005). The introductory statistics course with a calculus prerequisite had a larger percentage (61%) of instructors who were TTE faculty, and a smaller average section size (24); only 10% of the instructors were part-time faculty. Table S.8 is broken down further by the level of the four-year mathematics department in Chapter 5, Table FY.6.

Table S.8 also shows that mathematics programs at public two-year colleges enrolled 114,000 students in elementary probability and statistics courses. At two-year mathematics programs, the two courses in elementary statistics (one including probability and one without probability) saw an increase of 13% in the combined enrollment in 2010 compared with 2005. Sixty-one percent (61%) of the sections were taught by full-time faculty (down from 65% in 2005), and the average section size was 28 (up from 26 in 2005). No calculus-based elementary statistics course was included in the CBMS 2010 survey of two-year college mathematics programs.

The statistics department questionnaire inquired about "courses for non-majors or minors"; these courses included "Introductory Statistics (no calculus prerequisite)" and "Introductory Statistics (calculus prerequisite) (for non-majors)". As with these courses in four-year mathematics departments, both courses were broken down into the three kinds of sections: large lecture/recitation, regular classes with enrollment of 30 students or less, and regular classes with enrollments larger than 30; this data is given in Table S.9. Figure S.9.1 displays the percentage of the various ranks of faculty teaching the introductory statistics courses without a calculus prerequisite; this figure can be compared to Figure S.8.1, the figure for the analogous course taught in four-year mathematics departments. This is the first year that a statistics course for non-majors with a calculus prerequisite has been listed on the CBMS statistics department questionnaire, and in fall 2010 in statistics departments it enrolled roughly 16,000 students, compared to 56,000 in the course without a calculus prerequisite. The enrollment of 56,000 in the course without a calculus prerequisite represents a 24% increase over the fall 2005 enrollment in this course. Almost half of the students enrolled in the new course that has a calculus prerequisite were enrolled in a section with the large lecture and recitation format (this was the case for 66% of the students in the course without a calculus prerequisite). The percentage of sections taught by TTE faculty in the course with a calculus prerequisite was 43% (higher than the course without a calculus prerequisite, where it was 29%), the percentage of sections taught by part-time faculty in the course with the prerequisite was 9% (lower than the course without a calculus prerequisite, where it was 14%), and the average section size in the course with a prerequisite was 37 students (lower than the course without a calculus prerequisite, where it was 47). Chapter 5, Table FY.9 breaks the data in Table S.9 down further by the level of department. There were other changes made to the course titles of the introductory and upper-level statistics courses listed on the 2010 statistics questionnaire; data for all of the introductory-level statistics courses taught in statistics departments are given in Table S.9.

Pedagogical methods used in introductory courses (Tables S.10 to S.13)

Past CBMS surveys have contained questions regarding how introductory courses are taught. The 2010 survey purposefully decided to reduce the number of these questions for several reasons: the percentages of sections taught using some of the “reform methods” were small, some of the “reform methods” had become widely used (e.g. use of graphing calculators), there was an extensive survey of calculus pedagogy running parallel to the CBMS 2010 survey, and finally, it was felt that the 2005 CBMS survey instrument needed to be simplified. For these reasons, the survey of four-year mathematics departments asked about pedagogy only in College Algebra and in Introductory Statistics with no calculus prerequisite, while the survey of statistics departments asked only about Introductory Statistics with no calculus prerequisite (using the

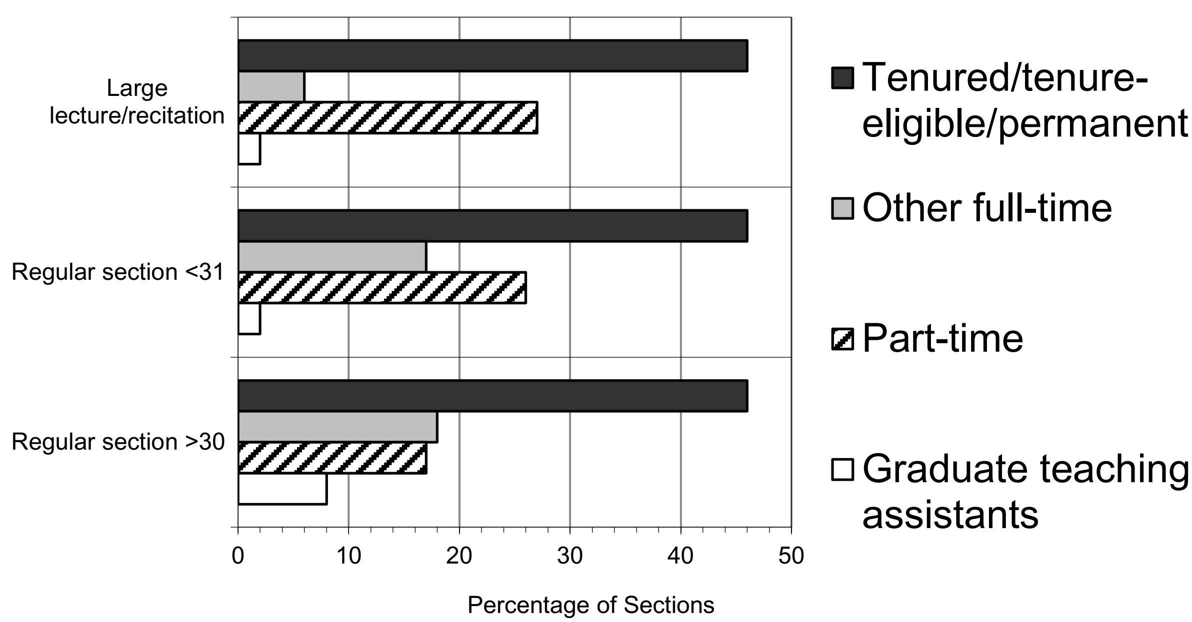

FIGURE S.8.1 Percentage of sections in Introductory Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible/permanent, other full-time, part-time, and graduate teaching assistants in mathematics departments at four-year colleges and universities by size of sections in fall 2010. Deficits from 100% represent unknown instructors.

TABLE S.9 Percentage of sections in elementary statistics for non-majors/minors (no Calculus prerequisite) and (Calculus prerequisite) taught by various kinds of instructors in statistics departments at four-year colleges and universities by size of sections in fall 2010. Also, total enrollments (in 1000s) and average section sizes. Distance-learning enrollments are not included. (Data from 2000, when available [2], show percentage of enrollments.) The comparable table in CBMS2005 is S.10, p. 22.

	Percentage of sections taught by						
Statistics Departments	Tenured/ tenure-eligible/ permanent [1] %	Other full-time %	Part-time %	Graduate teaching assistants %	Un-known %	Enroll-ment in 1000s	Average section size
Introductory Statistics (no calculus prerequisite) [3] (E1) [4]							
Large lecture/recitation	21	20	13	14	31	38	61
Regular section <31	44	25	20	4	7	5	23
Regular section >30	33	9	11	25	21	13	40
Course total	29	18	14	16	24	56	47
(2000, 2005) [2]	(36,26)	(17,21)	(22,16)	(19,22)	(6,15)	(40,42)	(65,63)
Introductory Statistics (calculus prerequisite) (for non-majors) (E2)							
Large lecture/recitation	35	21	9	10	25	7	46
Regular section <31	47	11	3	8	31	4	27
Regular section >30	47	13	15	14	11	5	37
Course total	43	15	9	11	23	16	37
Total of Introductory Statistics courses (E1 & E2) in 2010							
Large lecture/recitation	24	20	12	13	30	45	58
Regular section <31	45	19	13	6	16	9	25
Regular section >30	37	10	12	22	19	18	39
Course total	32	17	12	14	24	73	44

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

[2] Previous CBMS surveys gathered data for a course described as Probability and Statistics (no calculus prerequisite). Beginning in 2010, this description was replaced with Introductory Statistics (calculus prerequisite) (for non-majors).

[3] In previous CBMS surveys, this course was called "Elementary Statistics".

[4] E1 is the statistics course number on the four-year statistics survey form.

Sums of percentages across rows may differ from 100% due to round-off.

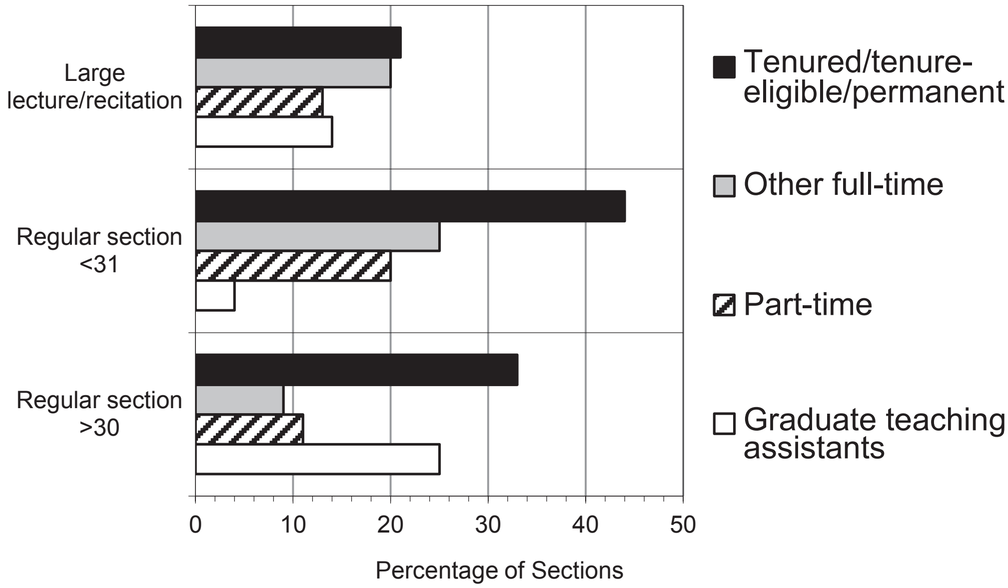

FIGURE S.9.1 Percentage of sections in Introductory Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible/permanent faculty, other full-time faculty, part-time faculty, and graduate teaching assistants in statistics departments at four-year colleges and universities by size of sections in fall 2010.

same questions as the four-year mathematics survey so that these responses could be compared). The two-year college survey asked fewer questions about a more limited set of reform methods. Hence, given the changes made to the 2010 questionnaire, the data that follows, while quite interesting, does not compare well to the data on pedagogy from previous surveys.

Tables S.10, S.11, and S.12 present data on ways Mainstream Calculus, Non-Mainstream Calculus, and Elementary Statistics courses were taught in mathematics programs at public two-year colleges. These tables show the percentages of sections taught using computer algebra systems, commercial computer packages, and those that were described as “mostly lecture”; these tables give the total enrollment (not including distance-learning enrollment) and the average section size. The corresponding Figures S.10.1, S.11.1, and S.12.1 display this data in bar graphs. The data show that, in two-year colleges, “mostly lecture” described 66% of the Mainstream Calculus I sections, 85% of the Mainstream Calculus II sections, 72% of the Non-Mainstream Calculus I sections, 84% of the Non-Mainstream Calculus II sections, and 81% of the Elementary Statistics sections. Computer algebra systems were used mostly in Mainstream Calculus I, and there was some use of commercial software, particularly in the Non-Mainstream Calculus and Elementary Statistics sections. Percentages of on-campus sections of specific mathematics courses at public two-year colleges using various instructional methods can be found in Table TYE.10 of Chapter 6.

It has been noted that introductory statistics course enrollments showed tremendous growth from 2005 to 2010, particularly at four-year mathematics departments and statistics departments, where their enrollments grew by more than 50% from 2005 to 2010. With the growth in introductory statistics course enrollments, there has been considerable interest in, and recommendations about, the pedagogy used in teaching these courses (see for example [CAUSE], [Moore], and [GAISE]). The 2010 CBMS survey developed a set of questions designed to measure the impact in mathematics and statistics departments of these and other reports regarding teaching elementary statistics in four-year colleges and universities. The first question in the pedagogy section of the four-year mathematics and statistics questionnaires asked the department to estimate the percentage of class sessions in which real data is used in most sections of its elementary statistics course; departments could choose between the percentage intervals 0-20%, 21-40%, 41-60%, 61-80%, and 81-100%. The percentage of departments that chose each of these intervals is given in Table S.13(A), broken down by mathematics/statistics departments, and Figure S.13(A).1 displays the distributions of these percentages in mathematics and statistics departments. The figure shows that mathematics departments' responses were skewed toward the lower percent-

TABLE S.10 Percentage of sections of Mainstream Calculus I and II taught using various instructional methods in mathematics programs in public two-year college mathematics programs in fall 2010. (Data for four-year colleges and universities and from two-year colleges for 1995, 2000, 2005 (with different categories) are reported in Table S.11, p. 24, of CBMS2005.) Also total enrollments (in 1000s) and average section sizes. Distance-learning sections are not included.

	Percentage of sections taught using				
Two-Year Colleges	Computer algebra systems %	Commercial packages %	Mostly lecture %	Enrollment in 1000s	Average section size
Mainstream Calculus I	9	12	66	63	20
Mainstream Calculus II	9	11	85	29	24
Total Mainstream Calculus I & II	9	12	71	93	21

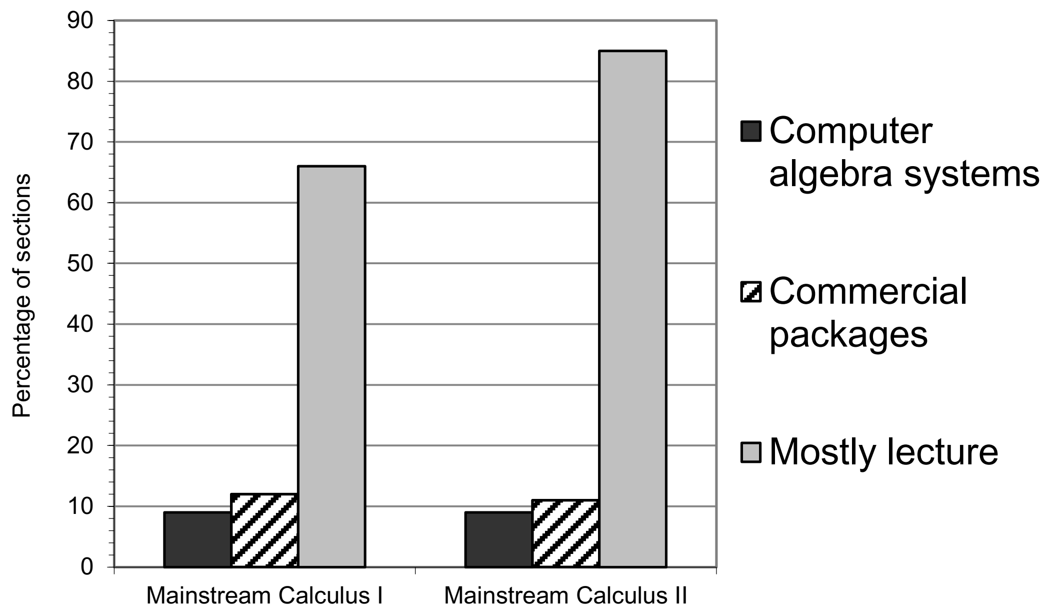

FIGURE S.10.1 Percentage of sections of Mainstream Calculus I and Mainstream Calculus II taught using various instructional methods in mathematics programs at public two-year colleges in fall 2010.

TABLE S.11 Percentage of sections of Non-Mainstream Calculus I taught using various instructional methods in mathematics programs at public two-year colleges in fall 2010. Also total enrollments (in 1000s) and average section sizes. Distance-learning sections are not included. (Data for four-year colleges and universities, and from two-year colleges from 1995, 2000, and 2005 (with different categories) are reported in Table S.12, p. 27, of CBMS2005.)

	Percentage of sections taught using				
Two-Year Colleges	Computer algebra systems %	Commercial packages %	Mostly lecture %	Enrollment in 1000s	Average section size
Non-Mainstream Calculus I	0	22	72	19	21
Non-Mainstream Calculus II	0	0	84	2	27
Total Non-Mainstream Calculus I & II	0	20	73	21	21

Note: 0 means less than one half of 1%.

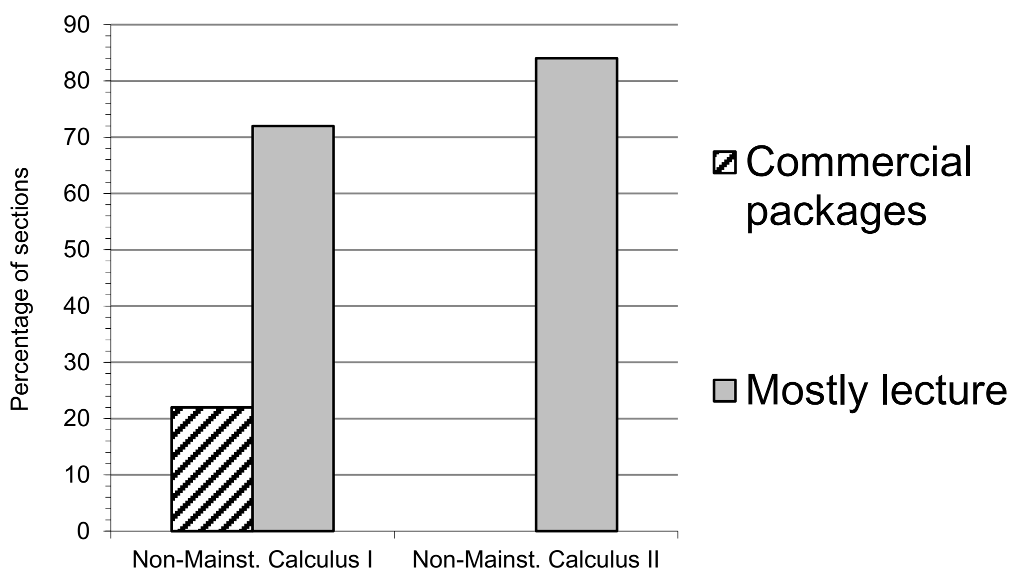

FIGURE S.11.1 Percentage of sections of Non-Mainstream Calculus I and Non-Mainstream Calculus II taught using various instructional methods in mathematics programs at public two-year colleges in fall 2010.

TABLE S.12 Percentage of sections of Elementary Statistics at mathematics programs at public two-year colleges taught using various instructional methods in fall 2010. Also total enrollment (in 1000s) (distance-learning courses excluded) and average section sizes. (Data from mathematics and statistics departments at four-year colleges and universities, and from public two-year colleges (with different categories) from 1995, 2000, and 2005 is reported in CBMS2005, Table S.13.)

	Percentage of sections taught using				
Two-Year Colleges	Computer algebra systems %	Commercial packages %	Mostly lecture %	Enrollment in 1000s	Average section size
Elementary Statistics	2	19	81	114	28

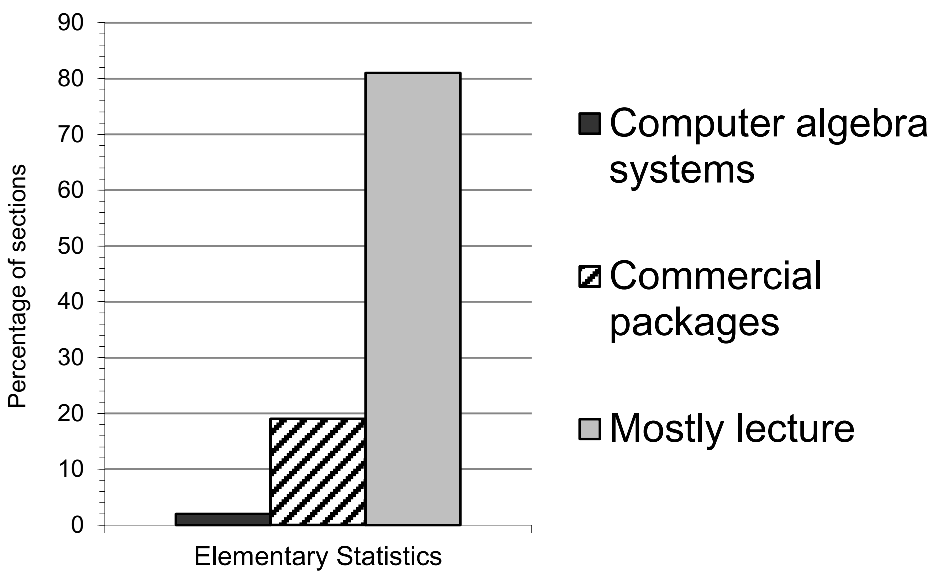

FIGURE S.12.1 Percentage of sections in Elementary Statistics (no Calculus prerequisite) taught using various reform methods in two-year colleges in fall 2010.

TABLE S.13 (A) Percentages of mathematics and statistics departments at four-year colleges and universities that use various practices to teach Introductory Statistics with no calculus prerequisite (for non-majors/minors) in the majority of the sections in fall 2010.

	% of Math Depts.	% of Stat Depts.
Offer elementary statistics course with no calculus prerequisite	84	88
Percentage of class sessions in which real data is used is:		
0-20%	18	9
21-40%	27	17
41-60%	19	16
61-80%	16	20
81-100%	20	38
Percentage of class sessions in which in-class demonstrations or problem solving activities take place is:		
0-20%	14	19
21-40%	29	22
41-60%	13	16
61-80%	25	17
81-100%	19	26
Majority of sections use the following kinds of technology:		
Graphing calculators	71	43
Statistical packages	55	87
Educational software	19	40
Applets	17	34
Spreadsheets	51	48
Web-based resources	54	74
Classroom response systems	10	29
Percentage of departments where the majority of sections require assessments beyond homework, exams, and quizzes	45	36

ages, while the statistics departments' responses were skewed toward the higher percentages. A second question asked departments to estimate the percentage of class sessions in which in-class demonstrations and/or in-class problem solving activities or discussions took place, and presented the same percentage intervals as responses. The results are given in Table S.13(A) and displayed in Figure S.13(A).2. For this question on in-class demonstrations/problem solving activities, there was less evidence of a different trend in the responses from the two kinds of departments. The third question asked departments about the use of the following kinds of technology in most sections of its elementary statistics course: graphing calculators, statistical packages, educational software, applets, spreadsheets, web-based resources (including data sources, online texts, and data analysis routines), and classroom response systems (e.g. clickers). The percentages of mathematics and statistics departments using each of these kinds of technology are given in Table S.13(A) . The data show that less sophisticated technology, such as graphing calculators, was more popular in elementary statistics courses taught in mathematics departments, spreadsheet use was about the same in mathematics and statistics departments, but all of the other kinds of technology were said to be used in higher percentages of statistics departments', rather than in mathematics departments', elementary statistics courses. The final question on teaching elementary statistics asked each department if most sections of the course required assessments beyond homework, tests and quizzes (assessments such as projects, oral presentations, or written reports); here the statistics courses taught in mathematics departments reported a higher percentage of affirmative responses (45% of mathematics departments responded "yes", while 36% of statistics departments responded "yes"). The responses to these questions are broken down by the type of department in Chapter 5, Tables FY.7 (for elementary statistics courses taught in mathematics departments) and FY.8 (for elementary statistics courses taught in statistics departments),

CBMS2010 showed that 46% of four-year college and university mathematics department enrollments and 75% of two-year college enrollments are in precollege (arithmetic and basic mathematics) and introductory-level mathematics courses (including college algebra and precalculus courses) (see Table S.2). Professional organizations, as well as many state legislatures and federal commissions such as the Spellings Commission, have expressed concern about the large numbers of post-secondary students enrolling in remedial/developmental courses. Concern about how college algebra courses are being taught led to recommendations by the MAA Committee on the Undergraduate Program in Mathematics (CUPM) subcommittee CRAFTY (Curriculum Renewal Across the First Two Years) on the teaching of college algebra [CRAFTY] and an AMATYC initiative called "The Right Stuff" [RightStuff]. CBMS2005 data on teaching strategies showed declines over 2000 and 1995 in the use of various "reform methods" [B1], and showed the same basic patterns in college algebra as in calculus. Hence, the 2010 CBMS survey of four-year mathematics departments contained a section of questions on how college algebra courses are taught.

Table S.13(B) summarizes data on the pedagogy used in teaching college algebra in two ways. The leftmost column of Table S.13(B) presents the "overall" percentage of sections using a particular pedagogy (this percentage was computed by taking the total number of sections in the nation using the technique and dividing this number by the total number of sections of college algebra in the nation); the rightmost column presents the "mean per department" percentage (this percentage was computed by finding the average number of sections using this technique at each responding institution and then averaging these departmental percentages). The first question on college algebra pedagogy asked four-year mathematics departments to estimate the number of sections in which problem solving was taught in "a modeling sense (data => model => interpretation)". Table S.13(B) shows that over all sections of college algebra taught at four-year mathematics departments in the U.S., the percentage of sections of college algebra in which this was reportedly done was 44%, while the average of the percentages from each department was 53%. Table S.13(B) presents both the overall sections average and the average of the department averages (i.e. average of the averages computed for each department), to nine other aspects of college algebra classes taught in four-year mathematics departments. The table shows that, overall, 65% "primarily use a traditional approach", 68% use online homework, 66% use graphing calculators, 36% use small group activities, 27% use elementary data analysis, 20% use small group projects, 16% include writing assignments, 9% include class presentations, 9% use classroom response systems (clickers), and 5% use spreadsheets. The responses of departments are broken down by the level of department in Chapter 5, Table FY.2.

The status of the course titled "College Algebra" at two-year colleges is presented in Chapter 6, Table TYE.11.2. Eighty-four percent (84%) of all departments offered a course called College Algebra, with 26% using a modeling and problem-solving approach. A graphing calculator was permitted in 65% of two-year college mathematics departments, along with other technology such as spreadsheets, commercial programs, computer algebra systems, and web-based resources.

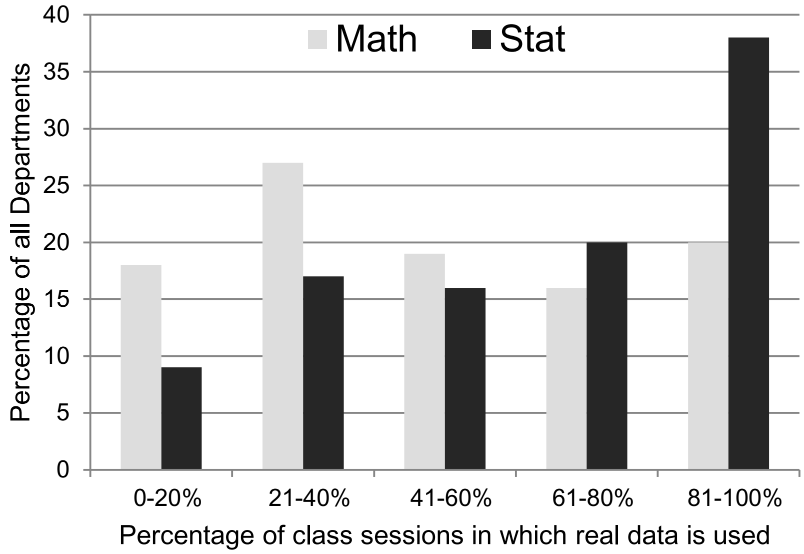

FIGURE S.13 A.1 Percentage of departments reporting the use of real data in the course *Introductory Statistics with no calculus prerequisite* by percentage of class sessions in which real data is used and by type of department.

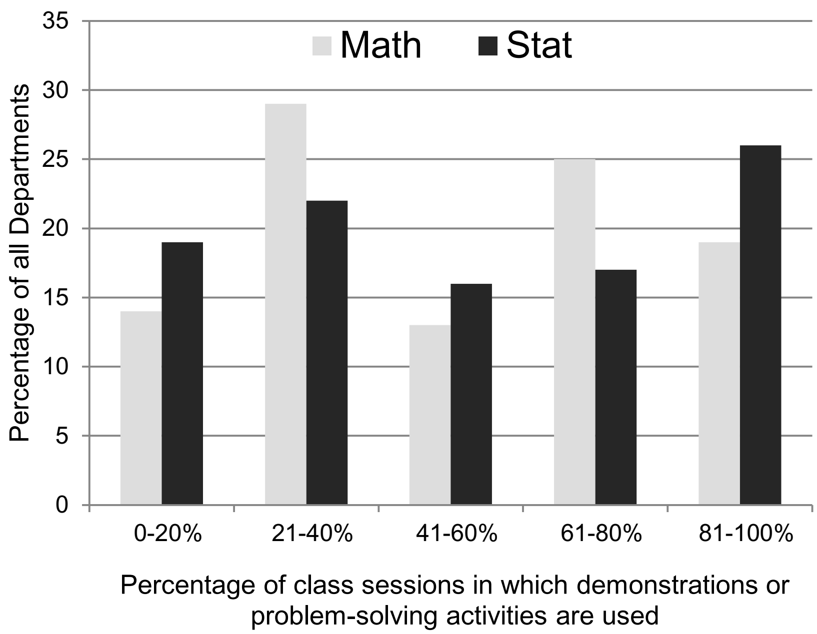

FIGURE S.13 A.2 Percentage of departments reporting in-class demonstrations or problem solving activities in the course *Introductory Statistics with no calculus prerequisite* by percentage of class sessions in which this activity takes place and by type of department.

TABLE S.13 (B) Percentage of sections of College Algebra in which various practices in teaching are used by mathematics departments at four-year colleges and universities in fall 2010.

Practices used in teaching College Algebra	Percentage of all sections, nationally	Mean of department-reported percentages
a. Emphasize problem solving in the modeling sense	44	53
b. Include elementary data analysis	27	26
c. Include writing assignments	16	23
d. Include small group activities	36	42
e. Include small group projects	20	22
f. Include class presentations	9	12
g. Use graphing calculators	66	72
h. Use spreadsheets	5	8
i. Use online homework generating and grading packages	68	58
j. Use classroom response systems (e.g., clickers)	9	8
k. Primarily use a traditional approach	65	70

Demographics of the mathematical sciences faculty

The remaining tables in this chapter present a snapshot of faculty demographics in mathematics and statistics departments of four-year colleges and universities, as well as in the mathematics programs of two-year colleges during fall 2010. Further details about faculty in mathematics and statistics departments of four-year colleges and universities appear in Chapter 4, while additional information about faculty in mathematics programs of public two-year colleges is given in Chapter 7.

Source of demographic data

The demographic data on mathematics and statistics department faculty in four-year colleges and universities contained in the CBMS 2010 report was not collected using the same survey instrument as the other data, nor was the same random sample of institutions used. The demographic data was collected as part of the *Annual Survey*, a stratified randomized survey conducted each year by the American Mathematical Society and overseen by the Joint Data Committee of five professional societies: the American Mathematical Society, the American Statistical Association, the Institute of Mathematical Statistics, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics. Reports on these surveys [JDC] are published each year in the Notices of the American Mathematical Society and online at http://www.ams.org/profession/data/annual-survey/annual-survey. Beginning with the CBMS survey in 2005, demographic data for the CBMS survey are collected as part of the *Annual Survey*; sampled departments were asked additional demographic questions that do not normally appear on the *Annual Survey* but are a part of the CBMS surveys.

In comparing data from the CBMS surveys to the data published in the *Annual Surveys*, one must keep in mind several differences between the two surveys. The tenured and tenure-eligible faculty (TTE) in the *Annual Surveys* do not include permanent faculty, unless the institution does not recognize tenure. The *Annual Surveys* do not include postdoctoral appointments as a part of “other full-time faculty” (OFT), while CBMS surveys do – i.e., CBMS survey tables list “other full-time faculty” (and these numbers include postdoctoral appointments), but they also break out the number of other full-time faculty who are postdoctoral appointments. The CBMS surveys of "statistics departments" include only statistics departments that offer an undergraduate program in statistics, while the *Annual Surveys* go to all departments of statistics and biostatistics that award a Ph.D. However, the data for statistics departments that do not have an undergraduate program in statistics are not included in the tables that appear in this report. The 2005 Annual Survey did not include masters-level statistics departments, but the 2010 survey did include these departments; hence, comparisons to 2005 are made using only doctoral statistics programs, though the 2010 data for masters-level statistics programs are presented in some tables. The *Annual Surveys* use stratified random samples of bachelors-level programs, but a census of doctoral and masters-level programs. The demographic data for mathematics faculty at public two-year colleges were collected from the CBMS survey instruments and samples, as two-year colleges are not a part of the *Annual Survey*.

The number of mathematical sciences faculty (Table S.14)

Table S.14 presents the number of faculty in mathematics and statistics departments of four-year colleges and universities, and in public two-year college mathematics programs, broken down into full-time faculty and part-time faculty in fall 1995, 2000, 2005, and 2010. Figure S.14.1 displays a graph of the numbers of full-time faculty at the three kinds of departments for each of the four years, while Figure S.14.2 shows the same information for the numbers of part-time faculty. Figures S.14.3, S.14.4, and S.14.5 display bar graphs of the numbers of full-time and part-time faculty for mathematics departments at four-year institutions, mathematics programs at two-year colleges, and statistics departments, respectively. Further details on the numbers of full and part-time

TABLE S.14 Number of full-time and part-time faculty in mathematics departments at four-year colleges and universities, in doctoral statistics departments at universities, and in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010. (Two-year college data for 2005 and 2010 include only public two-year colleges.)

	1995	2000	2005	2010
Four-Year Colleges & Universities				
Mathematics Departments				
Full-time faculty	19572	19779	21885	22293
Part-time faculty	5399	7301	6536	6050
Statistics Departments (PhD)				
Full-time faculty	840	808	946	1004
Part-time faculty	125	102	112	105
Two-Year College Mathematics Programs				
Full-time faculty	7742	7921	9403	10873
Part-time faculty[1]	14266	14887	18227	23453

[1] Paid by two-year colleges. In fall 2000, there were an additional 776 part-time faculty in two-year colleges who were paid by a third party (e.g. by a school district for a dual-enrollment course). In 2005, the number paid by a third party was 1915, and in 2010, the number paid by a third party was 2323.

Note on data sources: Data on four-year mathematics and on Ph.D.-granting statistics departments in Table S.14 are taken from reports of the AMS's Annual Survey of the Mathematical Sciences, co-sponsored by AMS/ASA/IMS/MAA/SIAM and published each year in the *Notices of the American Mathematical Society* . Combined data for statistics and biostatistics departments with Ph.D. programs are reported as Group IV data in those reports, and the figures reported in Table S.14 for statistics departments were obtained by removing all departments that do not have undergraduate programs from the Group IV totals.

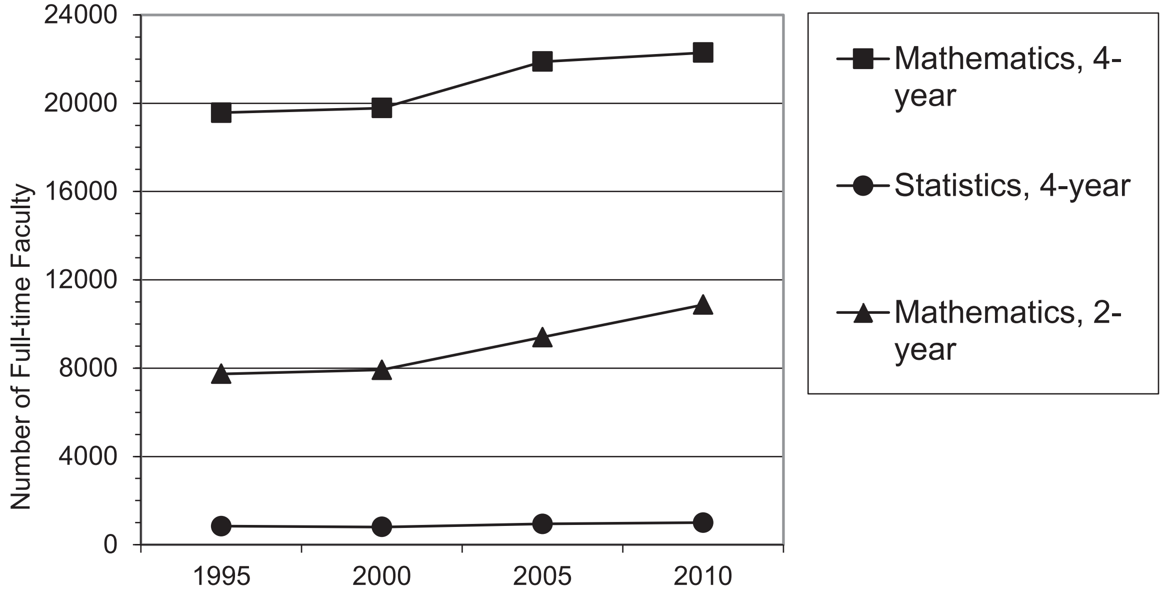

FIGURE S.14.1 Number of full-time faculty in mathematics departments of four-year colleges and universities, in doctoral statistics departments, and in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

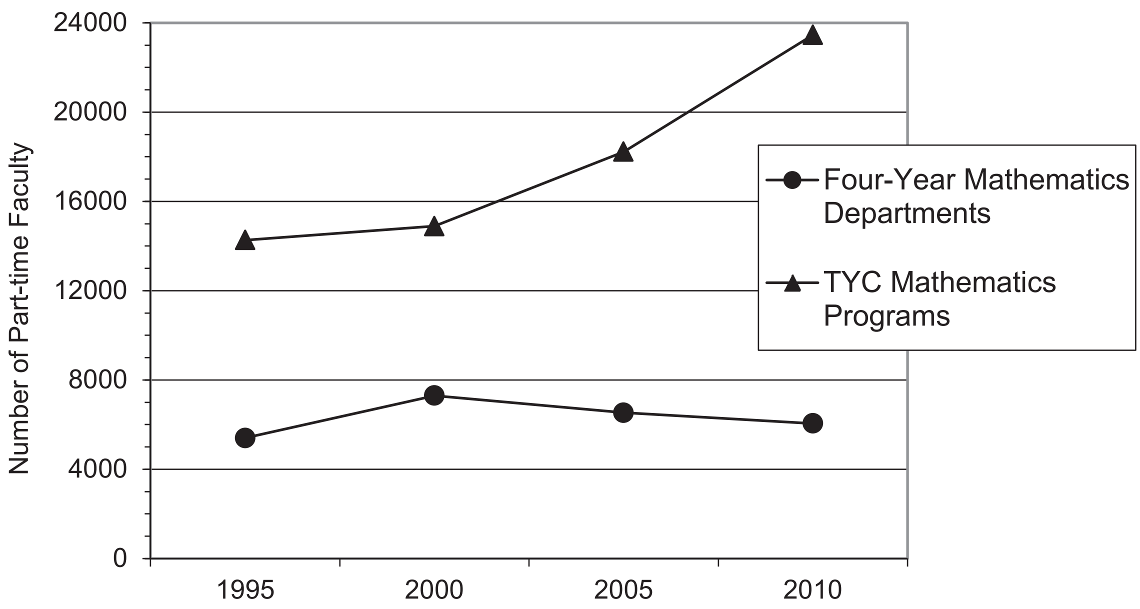

FIGURE S.14.2 Number of part-time faculty in mathematics departments at four-year colleges and universities and in mathematics programs at two-year colleges (TYCs) in fall 1995, 2000, 2005, and 2010.

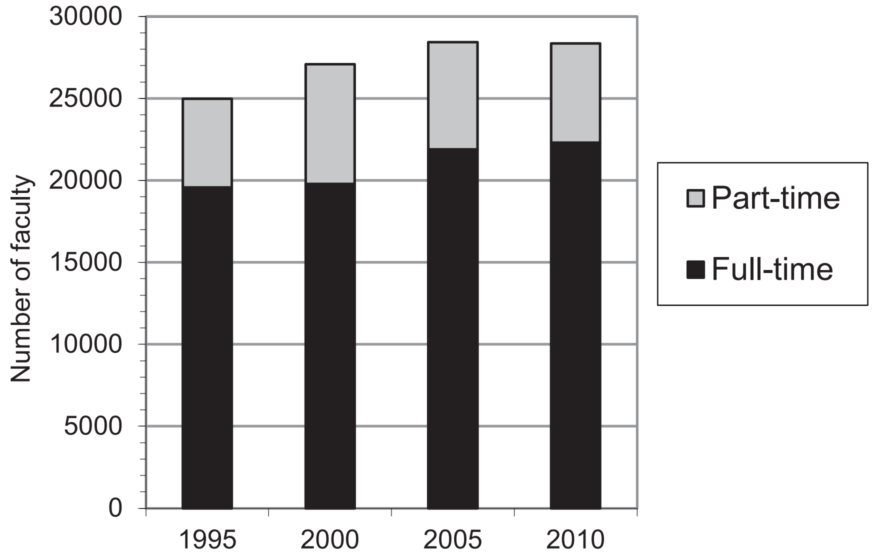

FIGURE S.14.3 Number of full-time and part-time faculty in mathematics departments of four-year colleges and universities in fall 1995, 2000, 2005, and 2010.

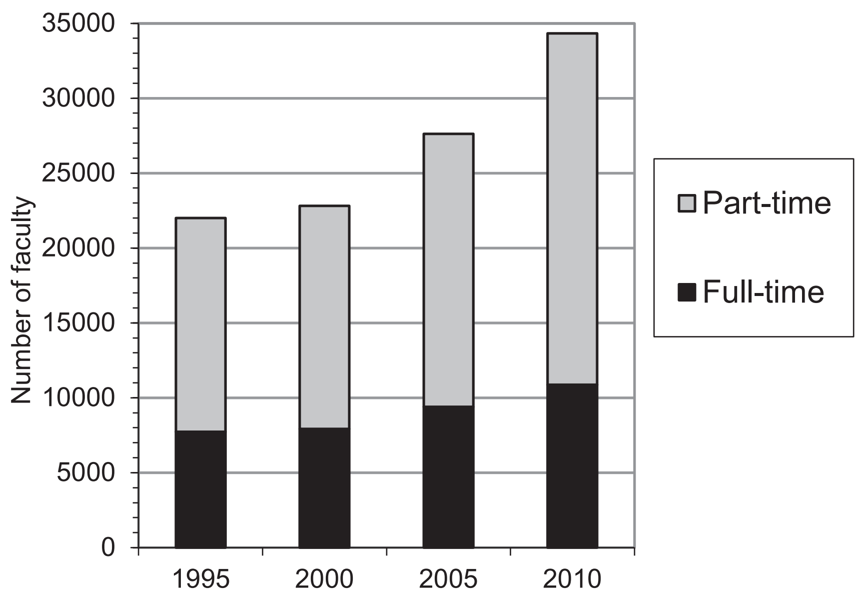

FIGURE S.14.4 Number of full-time and part-time faculty in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

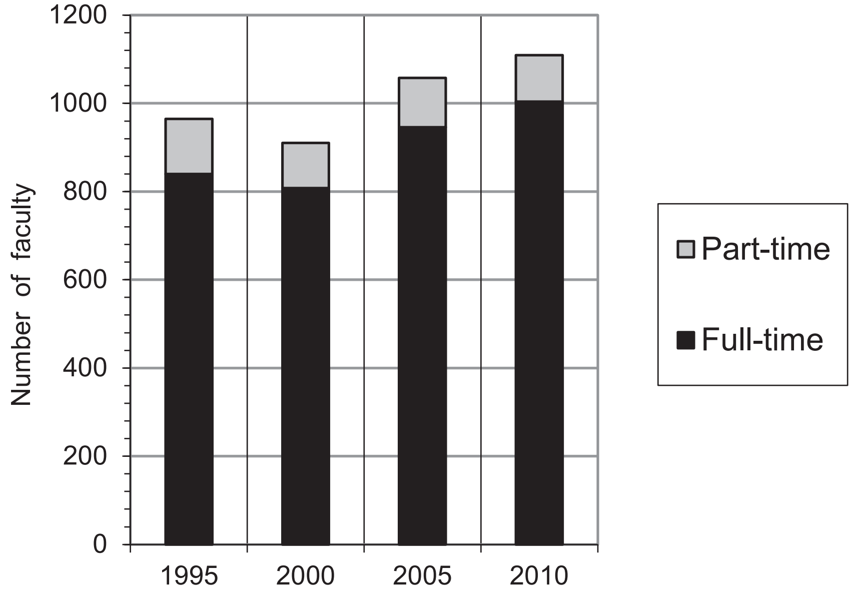

FIGURE S.14.5 Number of full-time and part-time faculty in doctoral statistics departments in fall 1995, 2000, 2005, and 2010.

faculty in four-year colleges and universities are presented in Chapter 4, Table F.1, and in Chapter 7, Table TYF.1 for two-year colleges.

Table S.14 and Figure S.14.3 indicate that, in fall 2010, the total number of full-time mathematics faculty plus part-time mathematics faculty for all levels of four-year mathematics departments combined remained about the same number as in 2005. The number of full-time mathematics faculty was up 2% from 2005 (a lower rate of increase than the 11% growth observed from 2000 to 2005), and the number of part-time mathematics faculty continued the pattern of small decline observed since 2000, and was down 7% from 2005. Table S.14 shows that, from 1995 to 2010, the number of full-time mathematics faculty in four-year departments grew by 14%, while Table S.1 shows that total course enrollments at four-year mathematics departments grew by 36%, and total four-year college enrollments grew by 43% over this same time interval, indicating that the growth in full-time faculty has not kept pace with the growth in their mathematical science course enrollments or the total undergraduate four-year college enrollments.

Table S.14 and Figure S.14.5 indicate that, in fall 2010, the total number of full-time plus part-time statistics faculty in doctoral-level statistics departments increased 5% from 2005 to 2010; the number of full-time doctoral-level statistics faculty increased by 6%, and the number of part-time doctoral-level statistics faculty decreased 6% from 2005. Table S.1 shows that doctoral statistics department enrollments have more than doubled since 1995, but they are up only 11% from fall 2000. The growth in full-time statistics faculty in doctoral departments also has not kept pace with the growth in their statistics course enrollments.

The number of public two-year college mathematics program faculty has increased at about the rate of their total course enrollments. Table S.14 shows that in two-year college mathematics programs, the number of full-time permanent and temporary faculty increased by 16% from fall 2005 to fall 2010 and by at least 40% from 1995 (the 1995 number of faculty includes faculty at private two-year colleges, while the 2010 number does not). Two-year college mathematics program enrollments rose 41% from 1995 to 2010, according to Table S.1. The 2010 CBMS survey is the first CBMS survey to report a larger number of total mathematics faculty (full-time plus part-time) at two-year departments than at four-year departments.

Appointment type and degree status of full-time faculty (Tables S.15 and S.16)

Table S.15 gives the numbers of full-time faculty in the mathematics and statistics departments of four-year colleges and universities in fall 2005 and fall 2010, broken down by their appointment type (TTE, other full-time, postdoc) and the highest degree obtained by the faculty member (doctoral degree or other degree). In this table (as in the other faculty

TABLE S.15 Number of full-time faculty who are tenured and tenure-eligible (TTE), postdocs, and other full-time (OFT) in mathematics and doctoral statistics departments of four-year colleges and universities, and in mathematics programs at two-year colleges, in fall 2005 and fall 2010. (Postdocs are included in the other full-time category.)

Four-Year Colleges and Universities	Fall 2005				Fall 2010			
Mathematics Departments	Total	TTE	Other full-time	Postdoc	Total	TTE	Other full-time	Postdoc
Full-time faculty	21885	17256	4629	819	22293	16364	5929	1025
Having doctoral degree	18071	15906	2165	813	18249	15646	2603	1024
Having other degree	3814	1350	2464	6	4044	717	3326	1
Doctoral Statistics Departments								
Full-time faculty	946	783	163	51	1004	789	215	71
Having doctoral degree	915	781	133	51	969	786	184	71
Having other degree	31	2	30	0	35	3	31	0
Total Math & Doc. Stat Depts	22831	18039	4792	870	23297	17153	6144	1096
Two-Year College Mathematics	Total full-time faculty	Full-time permanent	Full-time temporary		Total full-time faculty	Full-time permanent	Full-time temporary	
Full-time faculty	9403	8793	610		10873	9790	1083	
Grand Total	32234	26832	5402	870	34170	26943	7227	1096

Note: Round-off may make marginal totals seem inaccurate.

TABLE S.16 Gender among full-time faculty in mathematics and doctoral statistics departments of four-year colleges and universities by type of appointment, and among permanent full-time faculty in mathematics programs at two-year colleges in fall 2005 and fall 2010. Also gender among doctoral and masters degree recipients. (Postdocs are included in the other full-time category.) This table can be compared to Table S.17, p. 38, in CBMS2005.

Four-Year Colleges and Universities	Fall 2005					Fall 2010				
Mathematics Departments	Total	Tenured	Tenure-eligible	Other full-time	Postdoc	Total	Tenured	Tenure-eligible	Other full-time	Postdoc
Full-time faculty	21885	12874	4382	4629	819	22293	12747	3617	5929	1025
Number of women	5641	2332	1250	2059	191	6416	2740	1227	2449	233
	(26%)	(18%)	(29%)	(44%)	(23%)	(29%)	(21%)	(34%)	(41%)	(23%)
Doctoral Statistics Departments										
Full-time faculty	946	604	179	163	51	1004	580	209	215	71
Number of women	211	79	66	66	16	261	95	84	82	18
	(22%)	(13%)	(37%)	(40%)	(31%)	(26%)	(16%)	(40%)	(38%)	(25%)
	July 1, 1980 - June 30, 2010					July 1, 2005 - June 30, 2010				
Number of PhD's from US Math & Stat Depts[1]	32278					7259				
Number of women among new PhDs[1]	8051 (25%)					2349 (32%)				
Two-Year College Mathematics Programs	Total full-time	Full-time age < 40				Total full-time	Full-time age < 40			
Full-time faculty	8793	2326				9790	3244			
Number of women	4373	1148				4924	1764			
	(50%)	(49%)				(50%)	(54%)			
Masters degrees in mathematics and statistics granted in the U.S. in 2008-09[2]						5211				
Number of women among new masters recipients[2]						2147 (41%)				

[1] Reports of the Annual Survey of the Mathematical Sciences, *Notices of the AMS*, 1980-2011. Available at http://www.ams.org/profession/data/annual-survey/annual-survey

[2] 2010 Digest of Education Statistics, NCES, Table 300, available at http://nces.ed.gov/pubs2011/2011015.pdf

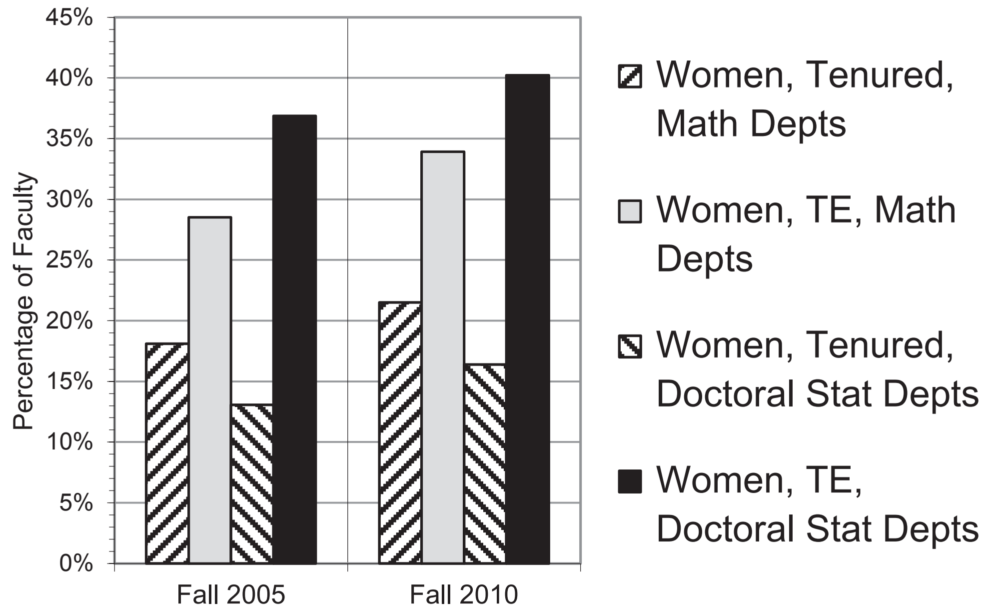

FIGURE S.16.1 Percentage of women in tenured and in tenure-eligible (TE) categories in mathematics departments of four-year colleges and universities and doctoral statistics departments in fall 2005 and 2010.

tables in this, and past, CBMS surveys), the category of other full-time faculty includes postdoctoral appointments, but the number of postdocs is also broken out of the number of other full-time faculty, so that trends in the growing category of postdoc faculty can be observed. The number of full-time faculty at two-year college mathematics programs is broken down into the categories of permanent and temporary faculty. Table S.16 considers only full-time faculty. It breaks the TTE faculty at four-year departments into tenured and tenure-eligible faculty, and it also presents the number of female faculty in each category; this table also considers the numbers of permanent faculty in public two-year college mathematics programs, broken down by gender, and it presents the numbers of those full-time permanent faculty under the age of 40. More detail on faculty at four-year mathematics and statistics departments can be found in Chapter 4, Table F.1, and on faculty in public two-year colleges in Chapter 7.

Table S.15 shows that when the 2% growth in the number of full-time mathematics faculty at four-year colleges and universities that occurred from fall 2005 to fall 2010 is broken down further, the components of this small growth in the number of full-time mathematics faculty were a 5% decline in the number of tenured plus tenure-eligible faculty and a 28% increase in the number of "other full-time faculty" (a category that includes postdoctoral appointments, a category which, by itself, increased by 25% from 2005). The 28% growth in other full-time faculty occurring between 2005 and 2010 came on top of a 31% increase in this category from 2000 to 2005. In fall 2010, postdoc appointments represented 17% of the category of other full-time faculty, almost the same as in 2005. The numbers of full-time mathematics faculty in four-year colleges and universities are also broken down by their highest degree, and Table S.15 shows that of the other full-time mathematics faculty who are not postdocs, the percentage of those with a doctoral degree decreased from 35% to 32%. Table S.16 shows that the number of tenured mathematics faculty incurred a small decline (127 faculty or 1%), while there was a larger decline (765 faculty or 17%) in the number of tenure-eligible mathematics faculty from 2005 to 2010. The decline in tenure-stream mathematics appointments, accompanied with the rise in non-tenure eligible appointments, is a concern that merits further study.

In doctoral statistics departments, Table S.15 shows that, from 2005 to 2010, the total number of tenured plus tenure-eligible statistics faculty grew by 6 faculty, the number of other full-time statistics faculty increased by 52 faculty (32% increase), and the number of postdoc statistics positions increased by 20 positions (39% increase). Table S.16 shows that, from 2005 to 2010, the number of tenured faculty decreased by 24 faculty, while the number of tenure-eligible faculty increased by 30 faculty. In fall 2000 there were 99 other full-time faculty in doctoral statistics departments, and in fall 2010 there were 215 other full-time faculty; hence, over the past ten years, this category of doctoral statistics faculty has more than doubled. Chapter 4, Table F.1 provides

TABLE S.17 Percentage of all tenured and tenure-eligible faculty in mathematics departments of four-year colleges and universities in various age groups, and average age, by gender in fall 2010. Percentage full-time permanent faculty in mathematics programs at public two-year colleges, by age, and average ages in fall 2010. Also, historical data from fall 2005 that can be found in Table S.18, p. 39, of CBMS2005.

Four-Year College & University Mathematics Departments	Percentage of tenured/tenure-eligible faculty										Average age 2005	Average age 2010
	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69		
	%	%	%	%	%	%	%	%	%	%		
Tenured men	0	1	4	7	9	10	10	10	7	4	53.7	54.6
Tenured women	0	0	2	3	3	3	2	2	1	0	50.2	50.7
Tenure-eligible men	2	5	4	2	1	0	0	0	0	0	38.9	36.9
Tenure-eligible women	1	3	2	1	1	0	0	0	0	0	38.6	37.8
Total tenured & tenure-eligible faculty	2	9	12	12	14	13	13	12	8	4		
	Percentage of permanent full-time faculty											
Two-Year College Mathematics Program	<30	30-34	35-39	40-44	45-49	50-54	55-59	>59				
Full-time permanent faculty	8	9	12	14	15	11	13	17			47.8	46.8

Note: 0 means less than half of 1%. Round-off may cause some marginal totals to appear inaccurate.

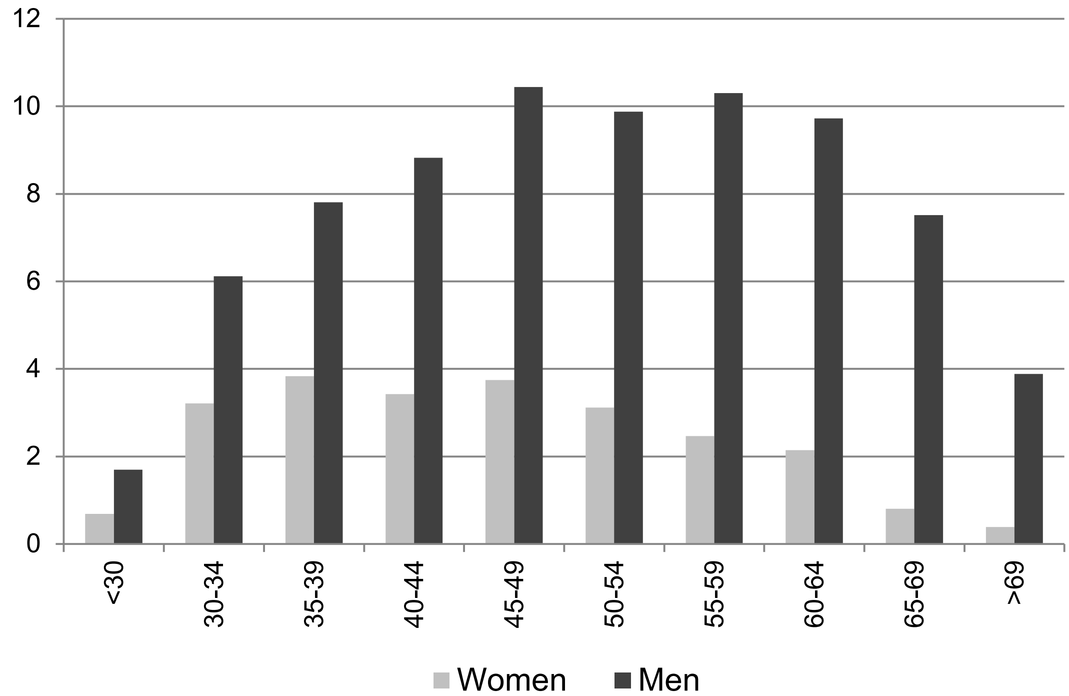

FIGURE S.17.1 Percentage of all tenured and tenure-eligible (TTE) faculty in mathematics departments at four-year colleges and universities belonging to various age groups, by gender, in fall 2010.

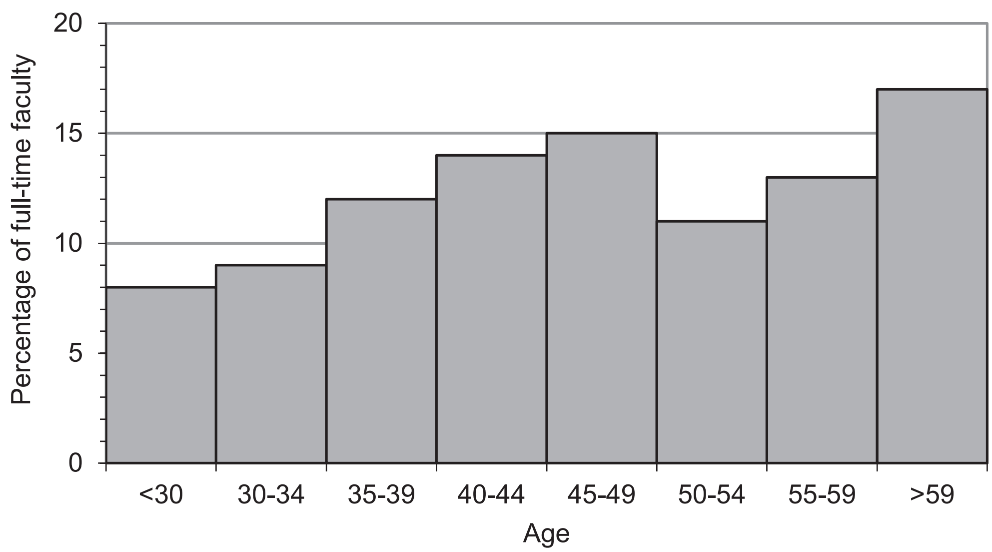

FIGURE S.17.2 Percentage of permanent full-time faculty in various age groups in mathematics programs at public two-year colleges in fall 2010.

more detail on numbers of statistics faculty, including data on masters-level statistics department faculty (data that was not gathered in 2005).

Table S.15 shows that the number of full-time permanent and temporary mathematics faculty at public two-year colleges increased from 9,403 in 2005 to 10,873 in 2010, a 16% increase, while temporary full-time faculty increased 78% from 2005 to a total of 1083 individuals in 2010 (see Table TYF.1). The number of full-time permanent mathematics faculty increased by 11%. Table S.16 shows that 30% of the full-time permanent mathematics faculty are under 40 years old. Chapter 7 gives more detail on the mathematics faculty at two-year colleges.

In fall 2010, a masters degree was the terminal degree for 83% of the full-time permanent mathematics faculty members at two-year colleges, up one percentage point from 2005. An additional 14% of full-time faculty held doctorates, and 3% held bachelors degrees. Of the total full-time permanent faculty, 68% held degrees in mathematics and 21% in mathematics education. See Tables TYF.4 and TYF.5 in Chapter 7.

Gender, age, and ethnicity among the mathematical science faculty (Tables S.16 to S.21)

According to the data from the *Annual Surveys*, the percentage of women receiving Ph.D. degrees in the mathematical sciences has remained close to 30% each year over the last ten years. Table S.16 shows that 32% of the new Ph.D.s that were awarded by mathematics and statistics departments between July 1, 2005 and June 30, 2010 went to women. The *Annual Surveys* and the CBMS surveys have shown a gradual increase in the percentage of women faculty. Table S.16, which breaks down the numbers of mathematical science faculty by gender, shows that this increasing trend in the percentages of women faculty continued from 2005 to 2010.

Table S.16 shows that in fall 2010, at all four-year mathematics departments combined, women comprised 29% of all full-time faculty, 21% of all tenured faculty, and 34% of all tenure-eligible faculty; each of these percentages is up several percentage points from 2005, even with the declining numbers of tenured and tenure-eligible mathematics faculty. In statistics departments in fall 2010, women were 26% of all full-time faculty, 16% of tenured faculty, and 40% of tenure-eligible faculty, all up from 2005. The *Annual Surveys* have shown larger percentages of Ph.D.s awarded to women in statistics than in mathematics. Figure S.16.1 displays the percentages of tenured and of tenure-eligible faculty that are women, in fall 2005 and in fall 2010, for mathematics departments and for doctoral statistics departments. In both 2005 and in 2010, mathematics departments had larger percentages of tenured women, but statistics departments had larger percentages of tenure-eligible women.

The percentage of women full-time faculty varies depending upon the highest degree offered by the department. Chapter 4, Tables F.1, F.2, and F.3 provide more detail on numbers of women faculty at four-year departments. Chapter 4, Table F.1 shows that, in 2005, women comprised 11% of the tenured and tenure-eligible faculty at doctoral-level mathematics departments, and by 2010 this percentage had risen to 14%. At bachelors-level mathematics departments, in 2005 women comprised 26% of the tenured and tenure-eligible faculty, and by 2010 this percentage had risen to 30%; in both cases the percentage of women at bachelors-level mathematics departments was more than double the percentage at doctoral-level mathematics departments.

Table S.16 shows that, in public two-year college mathematics programs in fall 2010, women comprised 50% of the full-time faculty positions (same as in 2005), and 54% of the full-time faculty of age less than 40 was female (up from 49% in 2005). More data on women faculty at two-year colleges are contained in Chapter 7 in Tables TYF.8, TYF.9, and TYF.17.

Table S.17 gives the distribution of ages among full-time mathematics faculty at four-year colleges and universities in fall 2010, broken down by tenured or tenure-eligible status and by gender. The average age of tenured men in four-year mathematics departments has been rising; it was 52.4 in 2000, 53.7 in 2005, and 54.6 in 2010. The average age of tenured women has also been rising; it was 49.6 in 2000, 50.2 in 2005, and 50.7 in 2010. For both men and women, the average ages of tenure-eligible mathematics faculty were lower in 2010 than in 2005, but the averages in 2010 were above the averages in 2000. The distribution of ages of tenured and tenure-eligible (combined) mathematics faculty in 2010 is quite similar to that in 2005, except for the increase in the percentage of mathematics faculty 65 and older, which increased from 8% in 2005 to 12% in 2010. A possible explanation for this decrease is that the downturn in the U.S. economy has led some senior faculty to postpone retirement. Figure S.17.1 shows the distribution of ages of male and female tenured and tenure-eligible mathematics faculty; one notes that the distribution of ages is shifted more toward lower ages for female faculty than for male faculty. Table S.17 is broken down by the level of the department in Chapter 4, Table F.4.

Table S.17 also gives the distribution of ages among permanent mathematics faculty at public two-year college mathematics programs. The average age of a permanent mathematics faculty member in fall 2010 is 46.8, down from 47.8 in 2005, and there are slightly higher percentages for the age categories at the two

TABLE S.18 Percentage of tenured and tenure-eligible faculty belonging to various age groups in doctoral and masters statistics departments (combined) at universities by gender, and average ages in fall 2010. Also average ages for doctoral statistics departments in fall 2005. Comparable table in the CBMS2005 report is S.19, p. 41.

All Statistics Departments	Percentage of tenured/tenure-eligible faculty										Average age 2005[1]	Average age 2010
	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69		
	%	%	%	%	%	%	%	%	%	%		
Tenured men	0	1	5	9	8	7	11	11	5	4	52.7	53.9
Tenured women	0	1	3	2	2	2	2	1	1	0	45.6	48.4
Tenure-eligible men	2	8	5	1	0	0	0	0	0	0	33.7	34.8
Tenure-eligible women	1	4	4	1	0	0	0	0	0	0	33.2	35.6
Total tenured & tenure-eligible faculty	**3**	**14**	**17**	**13**	**10**	**9**	**12**	**12**	**6**	**4**		

Note: 0 means less than half of 1%. Round-off may cause some marginal totals to appear inaccurate.

[1]Average ages for fall 2005 from CBMS2005 Table S.19.

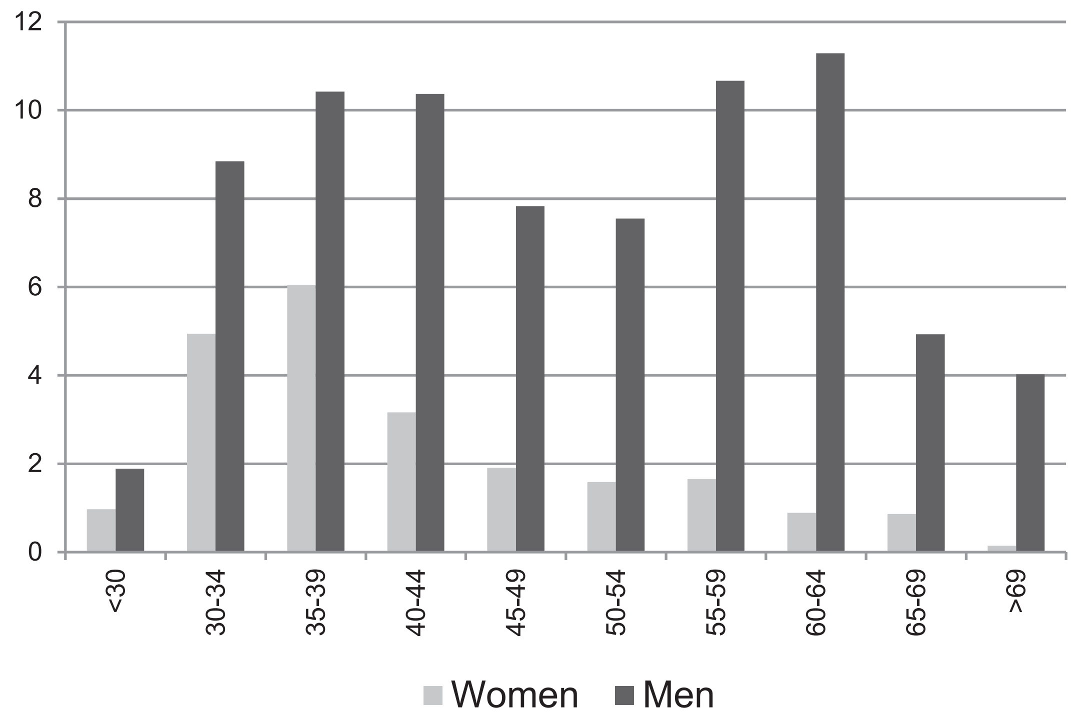

FIGURE S.18.1 Percentage of tenured and tenure-eligible faculty in various age groups, by gender, in doctoral and masters statistics departments (combined) in fall 2010.

lowest age brackets. Figure S.17.2, as well as Table TYF.16 in Chapter 7, display this distribution of ages.

Table S.18 gives the distribution of ages among full-time doctoral and masters statistics faculty (combined), broken down by tenured or tenure-eligible status and by gender. Each of the average ages was higher in 2010 than in 2005, and all averages, except those for tenure-eligible women, were higher in 2010 than in 2000. The distribution of ages for tenured and tenure-eligible women is displayed in Figure S.18.1 and, even to a greater extent than for mathematics faculty, the distribution of ages for women is skewed to lower ages than for men, reflecting the recent growth in tenured and tenure-eligible women statistics faculty.

Tables S.19 and S.20 give percentages of faculty for various racial/ethnic groups in mathematics and statistics departments at four-year colleges and universities. *Annual Surveys* follow the federal pattern for racial and ethnic classifications of faculty. However, in the text of CBMS2010, some of the more cumbersome federal classifications will be shortened. For example, "Mexican-American/Puerto Rican/other Hispanic" will be abbreviated to "Hispanic". Similarly, the federal classifications "Black, not Hispanic" and "White, not Hispanic" will be shortened to "Black" and "White", respectively, and "Native American/Alaskan Native/ Native Hawaiian/Pacific Islander" will be shortened to "Other/Unknown".

Table S.19 gives the percentages of gender and of racial/ethnic groups for tenured, tenure-eligible, postdoctoral, and other full-time four-year mathematics faculty. Comparing Table S.19 in CBMS2010 to the corresponding Table S.20 in CBMS2005, the percentages of the various racial/ethnic and gender groups look quite similar, with the most noticeable difference being a decrease from 2005 to 2010 in the percentage of White male faculty and an increase in White female faculty. The percentages of Black faculty and of Hispanic faculty, in fall 2010, remained small. Chapter 4, Table F.5 breaks these numbers down by the level of the department.

Table S.20 shows these percentages for all statistics faculty combined. Comparing Table S.20 in CBMS2010 to Table S.21 in CBMS2005, the percentage of White male faculty decreased from 2005 to 2010 by six percentage points, the percentage of White women decreased by one percentage point,

TABLE S.19 Percentage of gender and of racial/ethnic groups among all tenured, tenure-eligible, postdoctoral, and other full-time faculty in mathematics departments of four-year colleges and universities in fall 2010. Comparable table in CBMS2005 is S.20, p. 42.

Mathematics Departments	Asian %	Black, not Hispanic %	Mexican American/ Puerto Rican/ other Hispanic %	White, not Hispanic %	Other/ Unknown[1] %
Tenured Men	6	1	1	36	1
Tenured Women	1	0	0	10	0
Tenure-eligible men	2	0	0	8	0
Tenure-eligible women	1	0	0	4	0
Postdoctoral men	1	0	0	2	0
Postdoctoral women	0	0	0	1	0
Full-time men not included above	1	1	0	10	1
Full-time women not included above	1	0	0	9	1
Total full-time men	9	2	2	56	2
Total full-time women	3	1	1	23	1

[1] The column "Other/Unknown" includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander.

Note: 0 means less than half of 1% and this may cause apparent column sum inconsistencies.

TABLE S.20 Percentage of gender and of racial/ethnic groups among all tenured, tenure-eligible, postdoctoral, and other full-time faculty in doctoral and masters statistics departments (combined) at universities in fall 2010. Comparable table in CBMS2005 is S.21, p. 43.

All Statistics Departments	Asian %	Black, not Hispanic %	Mexican American/ Puerto Rican/ other Hispanic %	White, not Hispanic %	Other/ Unknown[1] %
Tenured Men	11	0	1	34	2
Tenured Women	2	0	0	6	1
Tenure-eligible men	5	1	0	6	1
Tenure-eligible women	5	0	0	3	0
Postdoctoral men	3	0	0	2	0
Postdoctoral women	1	0	0	1	0
Full-time men not included above	1	0	0	6	0
Full-time women not included above	1	0	0	5	1
Total full-time men	20	1	1	49	3
Total full-time women	8	0	1	15	2

[1] The column "Other/Unknown" includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander.

Note: 0 means less than half of 1%; round-off causes apparent column sum inconsistencies.

the percentage of Asian men and Asian women faculty have increased (two percentage points and one percentage point, respectively), the percentage of Black women decreased by one percentage point, and the percentage of Hispanic women increased by one percentage point. The percentages of Black faculty, and of Hispanic faculty, remained small.

Ethnic and gender breakdowns for part-time mathematics and statistics faculty at four-year colleges and universities, broken down by the level of the department for mathematics departments, is given in Chapter 4, Table F.6.

The distribution of mathematics program faculty in public two-year colleges among various ethnic groups is studied in Chapter 7. In fall 2010, sixteen percent (16%) of full-time permanent faculty members in mathematics programs were ethnic minorities, totaling 1566 faculty, up from 14% in 2005. The majority of the faculty represented in the ethnic minority groups were Asian/Pacific Islander or Black (non-Hispanic). See Tables TYF.10, TYF.11, and TYF.12. Among newly-hired full-time permanent faculty in fall 2010, 18% were ethnic minorities (Asian/Pacific Islander, Black, and Hispanic), and 47% were women. See Table TYF.20.

Table S.21 gives the number of deaths and retirements in mathematical sciences departments from the past four CBMS surveys, broken down by the level of the mathematics department. This data was not collected in 2010 for public two-year colleges. The data shows a smaller number of deaths and retirements among mathematics departments from masters and bachelors-level departments, perhaps indicating once more that some senior faculty postponed retirement.

TABLE S.21 Number of deaths and retirements of full-time faculty from mathematics departments and from doctoral statistics departments by type of department. Numbers reported prior to 2004-2005 for mathematics departments are of Tenured and Tenure-track faculty. (Data prior to 2004-2005 for statistics departments includes both masters and doctoral statistics departments.) The comparable table in CBMS2005 is S.22, p. 44.

Four-Year College & University	1994-1995	1999-2000	2004-2005	2009-2010	Number of tenured/ tenure-eligible faculty 2010
Mathematics Departments					
Univ (PhD)	172	174	139	146	5615
Univ (MA)	132	165	140	91	3209
Coll (BA)	137	123	219	123	7540
Total deaths and retirements in all Mathematics Departments	441	462	499	360	16364
Doctoral Statistics Departments: Total deaths and retirements	33	16	14	15	789

Chapter 2

CBMS2010 Special Projects

Each CBMS survey accepts proposals for special projects from various professional society committees. Special projects chosen for one CBMS survey might, or might not, be continued in the next CBMS survey. This chapter presents data from the special projects of CBMS2010:

- The mathematical education of pre-college teachers (Tables SP.1-SP.9)
- Practices in distance-learning courses (Tables SP.10-SP.13)
- Academic resources available to undergraduates (Tables SP.14 and SP.15)
- Interdisciplinary courses in four-year mathematics departments (Tables SP.16 and SP.17)
- Dual enrollments in mathematics and statistics (Tables SP.18 and SP.19)
- Requirements and varieties of majors in mathematics and statistics in four-year mathematics and statistics departments (Tables SP.20-SP.22)
- Availability of upper-level classes in four-year mathematics departments and statistics departments (Tables SP.23 and SP.24)
- Estimates of post-graduation plans of graduates of four-year mathematics departments and statistics departments (Table SP.25)
- Assessment in four-year mathematics departments and statistics departments (Table SP.26)

When there is comparable data in CBMS2005, the appropriate comparison table will be given in the caption if the table number is different from the CBMS2010 table number. Also note that further discussion of the special project issues at two-year colleges is given in the section "Special Topics of Interest to Two-Year-College Mathematics Programs", which is located at the end of Chapter 7.

Terminology: Recall that in CBMS2010, the term "mathematics department" includes departments of mathematics, applied mathematics, mathematical sciences, and departments of mathematics and statistics. These departments may offer a broad spectrum of courses in mathematics education, actuarial science, and operations research, as well as in mathematics, applied mathematics, and statistics. Computer science courses are sometimes also offered by mathematics departments. The term "statistics department" refers to a graduate department of statistics or biostatistics that offers undergraduate statistics courses. Courses and majors from separate departments of computer science, actuarial science, operations research, etc. are not included in CBMS2010. Departments are classified by the highest degree offered; for example, "masters-level department" refers to a department that offers a masters degree but not a doctoral degree.

TABLE SP.1 Percentage of mathematics departments whose institutions offer certification programs for some or all grades K–8, and also for secondary teachers, by type of department in fall 2010. (Data from fall 2000, 2005, when available, in parentheses)

	Percentage whose institutions have a K-8 teacher certification program	Percentage whose institutions have a secondary mathematics certification program
Mathematics Departments		
Univ (PhD)	62 (72,78)	79
Univ (MA)	90 (87,92)	96
Coll (BA)	70 (85,88)	80
Total Math Depts	72 (84,87)	82

Tables SP.1–SP.9: The Mathematical Education of Pre-college Teachers

Percentages of Four-year Mathematics Departments whose Institutions have Elementary and Secondary Teacher Certification Programs

Table SP.1 shows that, in fall 2010, 72% of four-year mathematics departments reported belonging to an institution that offered a teacher certification program for some or all grades K-8; this compares to 87% in 2005 and 84% in 2000. This table breaks down these percentages by the level of department, with the masters-level departments having the largest percentage of K-8 teacher certification programs in each of the three CBMS surveys 2000, 2005, and 2010. It is a bit surprising that these percentages decreased from 2005 to 2010; in both the CBMS 2005 and 2010 surveys, the standard errors on the percentages at each level are about 4-5 percentage points (3% at the doctoral level in 2010). It will be interesting to see the 2015 CBMS estimates. Table SP.1 also shows that in fall 2010 a larger percentage, 82% of four-year mathematics departments, belonged to an institution that offered a secondary teacher certification program; again, the percentage was largest for the masters-level departments.

Table SP.3 shows that the percentage of four-year mathematics departments having a "math specialist" program for any K-8 grade in fall 2010 was 24%, and of those, the percentage having a math specialist program for "early" elementary grades was 58%. A "math specialist" was defined as an elementary teacher who is likely to teach only mathematics courses; "early" was not defined, and it was noted that there is no national standard for which grades are "early" grades, though generally first and second grades are regarded as "early", while grades six and above are regarded as "later". Departments whose institutions had a K-8 certification program and a separate department or school of education were also asked if the mathematics department offered a course that was team-taught by mathematics and education faculty; the percentage of such departments was 8%. In Tables SP.1 and SP.3, these percentages are broken down by type of department.

Teacher Preparation Programs at Two-year Colleges

One finding of the CBMS2005 report was that public two-year colleges offered programs that allow three kinds of students to complete their entire mathematics certification requirements at the two-year college; Table SP.2 updates this data for fall 2010 and shows that teacher preparation programs are growing in two-year colleges. Table SP.2 also shows that two-year institutions were more involved in the preparation of elementary teachers than secondary teachers, though secondary teachers may take their lower-division mathematical requirements at a two-year institution. The three types of students mentioned in Table SP.2 are undergraduates without a bachelors degree ("pre-service teachers"), in-service teachers who already have certification in some other subject, and people who leave a first career to enter a second career in pre-college teaching ("career switchers"). With the exception of certification for in-service middle school teachers, the percentages of two-year institutions with teacher certification programs have all increased from 2005 to 2010 for each of the three kinds of students. While in fall 2010 the percentage of institutions with elementary teacher certification programs in mathematics was down slightly from fall

TABLE SP.2 Percentage of mathematical programs at public two-year colleges (TYCs) having organized programs that allow various types of pre- and in-service teachers to complete their entire mathematics course or licensure requirements in fall 2010. (Fall 2005 data in parentheses.)

	Percentage of TYCs with an organized program in which students can complete their entire mathematics course or licensure requirements
Pre-service elementary teachers	41 (30)
Pre-service middle school teachers	24 (19)
Pre-service secondary teachers	13 (3)
In-service elementary teachers	25 (16)
In-service middle school teachers	12 (15)
In-service secondary teachers	10 (2)
Career-switchers aiming for elementary teaching	30 (19)
Career-switchers aiming for middle school teaching	17 (14)
Career-switchers aiming for secondary teaching	13 (6)

2005 at four-year institutions, at two-year institutions certification programs in mathematics showed the biggest increase at the elementary school level for each of the three kinds of students. In fall 2010, the percentage of public two-year college mathematics programs with a complete certification program at the elementary level was 41%; at the middle-school level, it was 24%, and at the secondary level, it was 13%.

Table SP.4 gives some indication of the role that mathematics programs play in K-8 teacher certification programs at two-year colleges: 36% of mathematics programs assigned a faculty member to coordinate K-8 teacher education in mathematics, 7% offered a special mathematics course for K-8 teachers during a two-year period, 5% offered a mathematics pedagogy course in their mathematics program, and 9% reported that a mathematics pedagogy class is offered outside of the mathematics program. All these percentages were slightly lower than in 2005.

Further discussion of teacher education programs in two-year colleges is contained at the end of Chapter 7: Topics of Special Interest to Two-Year College Mathematics Programs. Among the items noted is that in the past ten years, from fall 2000 to fall 2010, the enrollment in the courses in mathematics for elementary school teachers in two-year colleges has doubled (see Table TYE.3 in Chapter 6). The data from the 2010 CBMS survey show that two-year colleges are becoming a more significant participant in the preparation of teachers.

Four-year Mathematics Departments: Courses Taken by Pre-service K-8 Teachers

For four-year mathematics departments whose institution had a K-8 certification program, the top portion of Table SP.5 shows the distribution of the number of mathematics courses required for "early" K-8 certification (if the institution made a distinction between kinds of K-8 certification, or for all K-8 certi-

TABLE SP.3 Percentages of four-year mathematics departments in universities and four-year colleges that offer K-8 teacher certification programs having various characteristics, by type of department, in fall 2010.

Percentage Where	Percentage of four-year math depts Univ (PhD) %	Univ (MA) %	College (BA) %	All Math Depts %
Dept. offers a K-8 certification program.	62	90	70	72
Dept. offers program for "math specialists" in any K-8 grades.	36	27	21	24
Of those departments that offer a program for "math specialists" in any K-8 grade, the percentage of depts offering a program for "math specialists" in early elementary grades.	44	72	58	58
Dept. offers courses team-taught with education dept.	11	5	8	8

fication if no distinction was made) among the various levels of departments. The table shows that, most commonly, two mathematics courses were required. The table is broken down by level of department and shows that masters-level departments were more likely to require more than two courses than were doctoral or bachelors-level departments. The bottom portion of the table shows the average numbers of required mathematics courses, methods (pedagogy) courses, and methods courses specifically taught within the mathematics department. Across all levels of departments, the average number of mathematics courses was 2.7, the average number of methods courses was 1.4, and the average number of methods courses taught within the mathematics department was 0.5; the averages in the masters-level departments were slightly higher. The data on numbers of required mathematics courses can be compared to the data in Table SP.5 (for early grade certification or for those programs that did not make a distinction) in the CBMS2005 report (p. 52); the 2005 survey also asked about mathematics course requirements for "later" grade certification.

Four-year mathematics departments with a K-8 certification program were also asked to indicate the core areas in which the mathematics department

TABLE SP.4 Percentage of public two-year colleges (TYCs) that are involved with K-8 teacher preparation in various ways in fall 2010. (Data from fall 2005 in parentheses.)

	Percentage of TYCs
Assign a mathematics faculty member to coordinate K–8 teacher education in mathematics	36 (38)
Offer a special mathematics course for preservice K–8 teachers in 2009–2010 or 2010–2011	7 (11)
Offer mathematics pedagogy courses in the mathematics department	5 (9)
Offer mathematics pedagogy courses outside of the mathematics department	9 (10)

TABLE SP.5 Among all four-year colleges and universities with a K-8 certification program, the percentage of mathematics departments requiring various numbers of mathematics courses for "early" grades certification (if there is a distinction), by type of department, in fall 2010. Also the average number of various courses taught in mathematics and education departments required for "early" grades certification (if there is a distinction), by type of department, in fall 2010. (Table can be compared to Table SP.5 in CBMS2005, where questions were broken down further.)

	Percentage of departments with K-8 certification programs that require various numbers of mathematics courses for "early" certification			
Number of mathematics courses required for "early" grades certification	Univ (PhD) %	Univ (MA) %	Coll (BA) %	All Math %
0 required	7	9	8	8
1 required	15	3	11	10
2 required	38	35	44	42
3 required	22	29	10	14
4 required	11	13	14	14
5 or more required	5	11	13	11

	Average number of various courses required for "early" certification			
Type of required courses	Univ (PhD)	Univ (MA)	Coll (BA)	All Math
Mathematics Department math courses	2.4	3.0	2.7	2.7
Methods (pedagogy) courses (taught in any department)	1.7	1.8	1.3	1.4
Mathematics Department methods (pedogogy) courses	0.6	0.8	0.5	0.5

Some percentages do not total 100% due to round-off.

offered courses specifically designed for elementary school teachers (more than one core area might be addressed in a single course). This data, broken down by level of department, is presented in Table SP.6; in each case, the masters-level departments were the most likely to offer a course addressing each core area. Overall, "numbers/operations" were addressed in specially designed courses offered by the mathematics department in 74% of four-year mathematics departments, "algebra" in 57% of departments, "geometry/ measurement" in 69% of departments, "statistics/ probability" in 56% of departments, and "methods of teaching elementary mathematics" in 31% of departments. In the 2005 report, data regarding the three most likely mathematics courses taken by elementary pre-service teachers was presented in Table SP.6 of the CBMS2005 report (p. 53).

Table SP.7 gives the rank of the faculty who generally taught the courses addressed in Table SP.6. At the doctoral-level departments, these faculty were most likely other full-time (non-tenure-track) faculty, but at the other levels of departments, they were generally tenured or tenure-track faculty. In Table SP.7 of the CBMS2005 report (p. 54), data on the rank of the most likely course coordinator of a multiple-section course, Elementary Mathematics Education, were presented.

TABLE SP.6 Among mathematics departments at four-year colleges and universities having K-8 certification programs, the percentage of mathematics departments offering various core courses specifically designed for pre-service elementary teachers by type of department in fall 2010. (Table SP.6 in CBMS2005 dealt with mathematics courses likely to be taken in K-8 certification programs.)

	Percentage of mathematics departments with K-8 certification program offering various courses			
Core areas covered by one or more specially designed courses(s) offered by mathematics departments	Univ (PhD)	Univ (MA)	Coll (BA)	All Math
Numbers/Operations	73	92	71	74
Algebra	58	64	55	57
Geometry/Measurement	67	94	64	69
Statistics/Probability	53	76	52	56
Methods of teaching elementary grades mathematics	27	36	31	31

TABLE SP.7 Among mathematics departments at four-year colleges and universities having K-8 certification programs and offering courses in core areas described in Table SP.6, the percentages of the faculty who generally teach these courses by rank and by the type of mathematics department in fall 2010. (Table SP.7 in CBMS2005 dealt with the rank of course coordinator.)

	Percentages of mathematics faculty at mathematics departments with K-8 certification program			
Rank of faculty who generally teach courses of SP.6	Univ (PhD)	Univ (MA)	Coll (BA)	All Math
Tenured/tenure-track faculty	30	79	63	62
Postdocs	0	0	0	0
Other full-time faculty	53	10	25	26
Part-time faculty	8	11	12	11
Graduate teaching assistants	9	0	0	1

Four-year Mathematics Departments: Courses in Secondary Certification Programs

Table SP.8 shows that less than 8% of four-year mathematics departments whose institution offers a secondary certification and has a separate education department or school offered a course that was team-taught with the education department; at doctoral-level departments, this percentage was 15%. Table SP.3 showed that such team-taught courses were offered at about a comparable rate among departments whose institution offered a K-8 certification program.

Table SP.9 gives the percentages of four-year mathematics departments that required courses in specified core areas for secondary mathematics certification, departments where courses in these core areas were not required but were generally taken by pre-service secondary teachers, and departments that offered courses specially designed for pre-service secondary teachers in these core areas. At all three types of departments, modern algebra and geometry were required by more than 85% of departments. At doctoral and masters-level departments, advanced calculus/analysis was required by more than 60% of departments. At masters and bachelors-level departments, statistics was required by more than 90% of departments. Doctoral-level departments were more likely to offer special courses for secondary pre-service teachers, with special geometry courses offered by 41% of the doctoral-level departments. Table SP.9 of the CBMS2005 report (p. 55) presented similar data on history of mathematics courses only.

TABLE SP.8 Among all four-year colleges and universities offering certification programs for pre-service mathematics secondary teachers, the percentage offering team-taught courses with education departments, by type of department, in fall 2010.

	Type of department			
	Univ (PhD)	Univ (MA)	Coll (BA)	All math
Percentage of departments at colleges and universities that have a separate education department	95	100	97	97
Of those with a separate education department, the percentage that offer courses team-taught by education and mathematics faculty	15	5	8	8

TABLE SP.9 Among four-year colleges and universities with secondary pre-service teaching certification programs, for various courses, the percentage of mathematics departments whose program requires the course, or whose students generally take the course, or who offer a special course in the given subject that is designed for secondary teachers, by type of department, in fall 2010.

	Percentage of departments with secondary certification program where:											
	Course is required				Course is generally taken, but not required				Math dept offers special course in the subject for secondary pre-service teachers			
Course	Univ (Ph.D) %	Univ (MA) %	Coll (BA) %	All math %	Univ (Ph.D) %	Univ (MA) %	Coll (BA) %	All math %	Univ (Ph.D) %	Univ (MA) %	Coll (BA) %	All math %
Advanced Calculus/ Analysis	63	61	46	51	11	3	18	15	17	4	2	4
Modern Algebra	87	92	89	89	5	6	6	6	25	2	4	7
Number Theory	30	30	27	28	23	22	18	20	24	0	3	6
Geometry	86	97	92	92	13	3	6	7	41	15	19	22
Discrete Mathematics	50	74	68	66	6	9	6	6	17	16	6	9
Statistics	76	97	91	90	18	3	5	7	9	11	5	6
History of Math	49	56	53	53	16	17	8	10	25	8	20	19

Tables SP.10–SP.13: Practices in Distance-Learning Courses

In the CBMS 2010 survey, a "distance-learning course" was defined to be a course in which "the instruction occurs with the instructor and the students separated by time and/or place (e.g. where the majority of the course is taught online, or by computer software, by television or by correspondence)". In Appendix I, enrollments for distance-learning courses taught by four-year mathematics and statistics departments are presented; Chapter 6, Table TYE.12 gives the comparable enrollments at two-year college mathematics programs. In fall 2010, by the tables in Appendix I, total distance-learning enrollments were 54,499 enrollments in courses at four-year mathematics departments and 4,171 enrollments in courses at statistics departments; Table TYE.12 shows that there were 187,523 enrollments in distance-learning courses at two-year mathematics programs. These enrollments represent a small percentage of all enrollments (2% of all four-year mathematics department fall enrollments, 4% of all statistics department fall enrollments, and 9% of all two-year college mathematics program fall enrollments). Enrollments in distance-learning courses appear to be growing, and the 2010 survey sought to explore some issues of their use and pedagogy.

Table SP.10 gives the percentages of some practices in distance-learning courses, broken down by the level of department. From Table SP.10 we see that in fall 2010, distance-learning courses were offered by 35% of the four-year mathematics departments and by 39% of the statistics departments. However, 88% of two-year college mathematics programs offered distance-learning courses. At four-year mathematics and statistics departments, the masters-level departments were those most likely to offer distance-learning courses; of four-year mathematics bachelors-level departments, only 28% offered distance-learning courses. Table SP.10 shows that at 72% of four-year mathematics departments offering distance-learning courses, all of the instruction was offered without the instructor being physically present; this was the case at 57% of the statistics departments. Table SP.10 further shows that among those two-year college mathematics programs offering distance-learning

TABLE SP.10 Percentage of mathematics, statistics, and public two-year college departments offering distance learning[1], and use of various practices with regard to distance learning in fall 2010.

	Mathematics Depts				Statistics Depts			Two-Year Colleges
	Univ (PhD)	Univ (MA)	College (BA)	Total	Univ (PhD)	Univ (MA)	Total	
Percentage offering distance learning	48	57	28	35	30	62	39	88
Characterize majority of course instruction:								
All instruction with no instructor physically present	68	61	77	72	83	25	57	na
Some instruction with no instructor physically present	32	39	23	28	17	75	43	na
Format of majority of distance learning:								
Complete online	na	na	na	na	na	na	na	73
Hybrid	na	na	na	na	na	na	na	22
Other	na	na	na	na	na	na	na	5
Instructional materials created by:								
Faculty	41	31	41	39	34	38	36	10
Commercially produced materials	10	16	5	9	0	13	6	12
Combination of both	49	53	53	52	66	50	58	78
How distance learning students take majority of tests:								
Not at a monitored testing site	22	35	33	31	26	29	27	11
At proctored testing site	55	32	37	40	34	29	32	42
Combination of both	23	33	30	29	40	43	41	47
Give credit for distance learning not offered through department:								
Yes	26	29	55	43	19	25	22	na
No	34	32	20	26	35	38	36	na
No department policy	39	39	25	31	47	38	42	na

[1] Distance-learning courses are those courses in which the majority of instruction occurs with the instructor and students separated by time and/or place (e.g. courses in which the majority of the course is taught online, or by computer software, by television, or by correspondence.)

courses, most of the distance-learning courses were completely online at 73% of the two-year college mathematics programs. As shown in Table SP.10, at four-year mathematics departments offering distance-learning courses, the majority of the course materials were created by faculty at 39% of the departments, were commercially produced at 9% of the departments, and were a combination of both at 52% of the departments; these percentages were quite similar in statistics departments (36%, 6%, and 58%, respectively). At two-year college mathematics programs, there was greater use of commercially produced materials and of a combination of faculty-produced along with commercially produced materials: 10% of two-year college mathematics programs offering distance-learning courses used material produced by faculty for the majority of their distance-learning courses, 12% used commercially produced materials, and 78% used a combination of both. As concerns have been expressed about the security of testing in distance-learning courses, the 2010 survey asked whether the majority of tests were given at a proctored testing site; as shown in Table SP.10, this was the case for 40% of four-year mathematics departments (55% of doctoral-level mathematics departments), at 32% of the statistics departments, and at 42% of the two-year college departments offering distance-learning courses; the majority of tests were not at a monitored test site for 31% of four-year mathematics departments, 27% of statistics departments, and 11% of two-year mathematics programs offering distance-learning courses. The 2010 CBMS survey asked departments offering distance-learning courses if they awarded credit for distance-learning courses offered by other institutions; Table SP.10 shows that 26% of four-year mathematics departments and 36% of statistics departments offering distance-learning courses do not award credit for distance-learning courses taken elsewhere.

Table SP.11 examines two distance-learning practices at two-year mathematics programs that offer distance-learning courses, namely, the use of common exams in multiple sections of distance-learning courses, and the time faculty whose total teaching load is all distance-learning courses were required to be on campus. When there were multiple sections of distance-learning classes at two-year mathematics programs offering distance-learning courses, 39% had no common exams in these courses, 20% had common exams in some sections of these courses, and 23% had common exams in all of these courses. Regarding required hours on campus, of two-year college mathematics programs offering distance-learning courses, 8% never required faculty to be on campus, 6% required faculty to be on campus only for scheduled meetings or appointments, and 21% required a specific number of on-campus office hours.

Table SP.12 considers courses that departments offered in both distance-learning and regular format, and asked for a comparison of the courses offered in the two formats. Almost all of the departments that offered distance-learning courses had the same course offered in both formats (89% of four-year mathematics departments, 100% of statistics departments, and 97% of two-year college mathematics programs), and the vast majority believed that the courses were generally the same. The content, goals, and objectives were thought to be the same at 99% of the four-year mathematics departments, 95% of the statistics departments, and 100% of the two-year college mathematics programs. The course outlines were the same at 97% of the four-year mathematics departments, 90% of the statistics departments, and 96% of the two-year college mathematics programs. Instructors were evaluated in the same ways at 81% of the four-year mathematics departments, 83% of the statistics departments, and 78% of the two-year college mathematics programs. Instructors held comparable office hours at 63% of the four-year mathematics departments and 65% of the statistics departments. The classes had the same projects at 72% of the four-year mathematics departments, 53% of the statistics departments, and 49% of the two-year college mathematics programs. The courses made the same use of common exams at 59% of the four-year mathematics departments, 53% of the statistics departments, and 47% of the two-year college mathematics programs. These numbers are broken down further by the level of department but are not very different at the various levels.

The 2010 CBMS survey contained a new question that asked four-year departments to note each upper-level course offered in distance-learning format. The numbers of departments reporting such courses were small, and our estimates are likely unreliable (particularly for statistics departments), but the data gathered are reported in Tables SP.13A and SP.13.B. If distance-learning courses become more common, these baseline data may be of some interest.

TABLE SP.11 Percentages of public two-year colleges (TYCs) with various practices in distance-learning courses in fall 2010.

Distance-learning course exams when there are multiple instructors teaching the course	% of TYCs
No common departmental exams	39
Common departmental exams for some courses	20
Common departmental exams for all courses	23
Not applicable or unreported	18
Requirements of faculty whose entire teaching load is distance-learning courses regarding time required to be on campus to meet with students	
Never	8
Only for scheduled meeting or student appointment	6
A specified number of office hours per week	21
Not applicable or unreported	65

TABLE SP.12 Percentage of four-year mathematics and statistics departments, and public two-year college (TYC) programs, with courses offered in both distance and non-distance-learning formats, and comparison of various practices in the distance learning and the non-distance-learning formats, by type and level of department, in fall 2010.

	Math				Stat			TYC
	Univ (PhD)	Univ (MA)	College (BA)	Total	Univ (PhD)	Univ (MA)	Total	
Some courses in both non-distance and distance-learning formats	93	90	87	89	100	100	100	97
Of those with courses in both formats, the percentage where:								
Contents, goals, and objectives same as in non-distance learning	98	100	99	99	92	100	95	100
Instructors hold comparable office hours on campus	62	73	59	63	56	75	65	na
Instructors participate in evaluation in same way	72	77	86	81	91	75	83	78
Same use of common exams as in face-to-face	56	51	63	59	56	50	53	47
Same course outlines as in face-to-face	95	100	97	97	92	88	90	96
Same course projects as in face-to-face	74	78	68	72	56	50	53	49

TABLE SP.13.A Percentage of four-year mathematics departments offering various upper-level mathematics courses by distance learning, by department type, in fall 2010.

	Mathematics Departments			
	Univ (PhD)	Univ (MA)	College (BA)	Total
E22. Introduction to Proofs	1	4	1	1
E23-1. Modern Algebra I	1	1	0	1
E23-2. Modern Algebra II				
E24. Number Theory	1			0
E25. Combinatorics				
E26. Actuarial Mathematics				
E27. Logic/Foundations (not E22)				
E28. Discrete Structures			0	0
E29. History of Mathematics	3	5	1	2
E30. Geometry	2		0	0
E31-1. Advanced Calculus I and/or Real Analysis I	1	4		1
E31-2. Advanced Calculus II and/or Real Analysis II				
E32. Advanced Mathematics for Engineering and Physical Sciences	1			0
E33. Advanced Linear Algebra (beyond E17, E19)	1			0
E34. Vector Analysis				
E35. Advanced Differential Equations (beyond E18)				
E36. Partial Differential Equations				
E37. Numerical Analysis I and II	1			0
E38. Applied Mathematics (Modeling)				
E39. Complex Variables	1			0
E40. Topology				
E41. Mathematics of Finance (not E26, E38)	1			0
E42. Codes and Cryptology				
E43. Biomathematics			1	1
E44. Operations Research (all courses)				
E45. Senior Seminar/ Independent Study in Mathematics				
E46. Other advanced-level mathematics				
E47. Mathematics for Secondary School Teachers	2	4		1

Note: These estimates are based on small numbers and have large standard error. Blank entries represent courses with no responses while zero entries indicate percentages that round to 0%.

TABLE SP.13.B Percentage of four-year mathematics and statistics departments offering upper-level statistics courses by distance learning, by department type, in fall 2010.

	Mathematics Departments				Statistics Departments		
	Univ (PhD)	Univ (MA)	College (BA)	Total	Univ (PhD)	Univ (MA)	Total
E6. Mathematical Statistics (calculus prerequisite)							
E7. Probability (calculus prerequisite)	1			0	2		1
E8. Combined Probability & Statistics (calculus prerequisite)	1			0			
E9. Stochastic Processes							
E10. Applied Statistical Analysis	1	3		1	5		4
E11. Design & Analysis of Experiments					3		2
E12. Regression (and Correlation)	1		1	1	3		2
E13. Biostatistics					3		2
E14. Nonparametric Statistics					3		2
E15. Categorical Data Analysis							
E16. Sample Survey Design & Analysis							
E17. Statistical Computing							
E18. Data Management							
E19. Senior Seminar/ Independent Studies							
E20. Bayesian Statistics							
E21. Statistical Consulting							
E22. Statistical Software					2		1
E23. Other upper-level Probability & Statistics	2			0			
E23. Other mathematical science courses					3	8	4
F16. Statistical Computing (Math only)							

Note: These estimates are based on small numbers and have large standard error. Blank entries represent courses with no responses while zero entries indicate percentages that round to 0%.

TABLE SP.14 Percentage of mathematics and statistics departments in four-year colleges and universities, and of mathematics programs at public two-year colleges, that offer various kinds of special opportunities for undergraduates, by type of department, in fall 2010. (Fall 2005 data in parentheses.) This table can be compared to Table SP.14 in CBMS2005.

Percentage with special opportunities for undergraduates	Honors sections of courses for majors %	Math or Stat club %	Special programs for women %	Special programs for minorities %	Math or Stat contests %	Special Math or Stat colloquia for undergrads %	Outreach in K–12 schools %
Mathematics Departments							
Univ (PhD)	70 (70)	91 (88)	31 (15)	21 (10)	93 (92)	82 (70)	71 (51)
Univ (MA)	40 (44)	96 (92)	21 (21)	21 (23)	82 (68)	88 (71)	75 (63)
Coll (BA)	15 (18)	75 (66)	16 (4)	12 (6)	62 (62)	51 (37)	40 (26)
Total Mathematics Departments	26 (28)	80 (72)	19 (8)	14 (8)	69 (67)	60 (46)	49 (34)
Statistics Departments							
Univ (PhD)	43 (27)	48 (27)	19 (0)	22 (7)	24 (22)	67 (47)	30 (11)
Univ (MA)	55 (41)	45 (29)	0 (0)	0 (0)	36 (29)	82 (44)	18 (15)
Total Statistics Depts	46 (30)	47 (27)	13 (0)	15 (6)	28 (23)	71 (46)	27 (12)
Two-Year College Mathematics Programs	20 (24)	31 (22)	6 (7)	11 (15)	41 (37)	16 (6)	32 (25)

Note: 0 means less than one-half of 1%.

TABLE SP.15 Percentage of mathematics and statistics departments in four-year colleges and universities, and of mathematics programs in public two-year colleges, that offer various additional special opportunities for undergraduates, by type of department, in fall 2010. (Fall 2005 data, where available, in parentheses.) This table can be compared to Table SP.15, p. 60, of CBMS2005.

Percentage with additional opportunities for undergraduates	Undergrad. Research opportunity %	Indep. Studies opportunity %	Assigned advisors in dept. %	Senior thesis opportunity %	Math career day %	Graduate school advising %	Internship opportunity %	Senior seminar opportunity %	Consulting lab with clients %
Mathematics Departments									
Univ (PhD)	96 (90)	96 (95)	90 (85)	63 (62)	40 (24)	67 (49)	50 (47)	47 (39)	
Univ (MA)	91 (74)	100 (91)	100 (97)	56 (53)	46 (15)	70 (61)	67 (55)	66 (46)	
Coll (BA)	83 (54)	94 (79)	90 (88)	58 (48)	17 (10)	46 (45)	55 (35)	59 (38)	
Total mathematics depts	86 (62)	95 (83)	91 (89)	59 (50)	24 (12)	52 (47)	56 (39)	58 (39)	
Statistics Departments									
Univ (PhD)	85 (60)	90 (62)	89 (73)	54 (27)	30 (15)	66 (56)	69 (47)	30 (15)	32
Univ (MA)	82 (59)	100 (100)	73 (85)	27 (44)	45 (15)	64 (59)	91 (71)	27 (29)	55
Total statistics depts	84 (60)	93 (70)	84 (76)	46 (31)	35 (15)	66 (57)	75 (52)	29 (18)	39
Two-Year College Mathematics Programs	14 (9)	36 (38)	42 (40)	na (na)	na	na	na	na	

Tables SP.14-SP.17: Academic Resources Available to Undergraduates

Tables SP.14 and SP.15 present a spectrum of academic enrichment activities available in various kinds of mathematics and statistics departments at all levels. In most cases the availability of these options has expanded in 2010 over 2005. Generally, the availability of these options increased as departments offered higher-level degrees (e.g. honors sections were available at 70% of doctoral-level four-year mathematics departments but only at 15% of the bachelors-level four-year departments). Special programs for women and minorities have increased at almost all levels of four-year mathematics and statistics departments, and special colloquia for undergraduates have increased for all types of mathematics and statistics programs. Outreach to K-12 schools also has increased at all levels of institutions, including two-year colleges (though the percentage for all four-year mathematics has returned to the level of 2000). More bachelors-level mathematics departments offered undergraduate research opportunities in 2010 than in 2005 (83% in 2010 and 54% in 2005) and senior thesis opportunities (58% in 2010 and 48% in 2005); career days and internship opportunities have increased at all levels of four-year mathematics and statistics departments.

Generally, there were small changes from 2005 to 2010 in the percentages of two-year colleges offering these special opportunities. The largest changes were in the percentage offering a mathematics club (up to 31% in 2010 from 22% in 2005) and the percentage offering special colloquia (up to 16% in 2010 from 6% in 2005).

CBMS2010 was also interested in interdisciplinary courses. Table SP.16 gives the percentages of departments that offered none, one, or two or more courses that were "team taught" with a member of another department. Table SP.17 gives the percentages of mathematics departments at four-year colleges and universities that offered a new interdisciplinary course in the last five years; of those that offered such a course, Table SP.17 also gives the percentage of departments that offered courses in various subject areas, as well as the average number of new courses those departments added, broken down by type of department. New interdisciplinary courses were offered most often at doctoral-level, followed by masters-level, departments. The most frequently offered new courses at doctoral-level departments were in mathematical biology, where an average of 1.5 new courses were introduced; the second most popular area was mathematics and business or finance. For masters-level departments, mathematical biology and mathematics and finance or business were the top two areas for new interdisciplinary courses, while for bachelors-level departments, mathematics and education, and mathematics and the humanities, were the most popular areas for new interdisciplinary courses.

TABLE SP.16 Percentages of four-year mathematics and statistics departments offering various numbers of courses team-taught with a member of another department in spring or fall 2010

	Mathematics Departments				Statistics Departments		
Numbers of team-taught courses	Univ (PhD) %	Univ (MA) %	College (BA) %	Total %	Univ (PhD) %	Univ (MA) %	Total %
None	73	70	89	84	78	100	84
One course	15	30	7	12	14	0	10
Two or more courses	12	0	3	4	8	0	6

TABLE SP.17 Percentage of all four-year mathematics departments offering new interdisciplinary courses in the last five years and, among those offering new course(s) in the given area, the average number of new courses offered, by type of department, in fall 2010.

	Univ (PhD)		Univ (MA)		Coll (BA)		All departments	
Percentage that offered any new interdisciplinary course	56		45		30		36	
Of those offering any new course, those offering course in:	Offered new course %	Mean number of new courses	Offered new course %	Mean number of new courses	Offered new course %	Mean number of new courses	Offered new course %	Mean number of new courses
Mathematics and finance or business	24	1.5	20	1.1	1	2.0	8	1.4
Mathematics and biology	41	1.5	20	1.0	3	1.2	12	1.3
Mathematics and the study of the environment	3	1.0	12	1.0	5	1.0	5	1.0
Mathematics and engineering or the physical sciences	13	1.8	9	1.0	4	1.0	6	1.3
Mathematics and economics	4	1.0	5	1.0	3	1.1	4	1.1
Mathematics and social sciences other than economics	1	1.0	5	1.0	0	0	1	1.0
Mathematics and education	18	2.0	14	1.4	13	1.6	14	1.7
Mathematics and the humanities	5	1.0	13	1.0	13	1.4	12	1.3
Other	2	1.0	0	0	10	1.3	8	1.2

Tables SP.18 and SP.19: Dual Enrollments–College Credit for High School Courses

Dual-enrollment courses were defined to be "courses conducted on a high school campus and taught by high school teachers, for which high school students may obtain high school credit and, simultaneously, college credit." This arrangement is not the same as obtaining college credit based on an AP or IB exam. Dual enrollment is encouraged by many state governments as a way of utilizing state-wide educational resources efficiently, and there has been some concern over rising dual enrollments (see, e.g., [B2]).

Table SP.18 shows that dual-enrollment courses were offered predominately by mathematics programs at two-year colleges; in fall 2010, 61% of mathematics programs at two-year colleges, 17% of mathematics departments at four-year colleges and universities, and 8% of statistics departments offered dual-enrollment courses (all of these percentages were increases, except for statistics departments, where the percentage remained the same). The enrollment in dual-enrollment courses offered by mathematics departments in four-year colleges and universities in spring and fall (combined) of 2010 was 42,862, with slightly more than half of the enrollments in the fall 2010. Mathematics programs in two-year colleges had a total of 158,097 enrollments in spring and fall (combined) 2010, almost four times the enrollment from four-year colleges and universities and an 89% increase over 2005. Statistics departments had a much smaller number, 1,573, of dual enrollments, and this was a smaller number than reported in 2005. College Algebra and Precalculus were the courses at two-year college mathematics programs with the largest number of dual enrollments. Calculus dual enrollments at two-year colleges were more than double those at four-year colleges and universities.

The percentage of two-year college mathematics programs entering into dual-enrollment agreements increased from 50% in 2005 to 61% in 2010. With the exception of Calculus I, two-year college mathematics courses incurred large growth in dual enrollments. College Algebra dual enrollments for spring and fall combined increased from 21,275 in 2005 to 52,828 in 2010 (a 148% increase), Precalculus dual enrollments in spring and fall combined increased from 28,451 in 2005 to 43,778 in 2010 (a 54% increase), Calculus I dual enrollments for spring and fall combined increased from 19,406 in 2005 to 20,531 in 2010 (a 6% increase), Elementary Statistics dual enrollments for spring and fall combined increased from 6,088 to 11,768 (a 93% increase), and other course dual enrollments for spring and fall combined increased from 8,497 to 29,192 (a 244% increase). In 2010, two-year mathematics programs' fall dual enrollments represented 13% of College Algebra enrollments, 36% of Precalculus enrollments, 17% of Calculus I enrollments, and 3% of Elementary Statistics enrollments; in each case, except in Calculus I, these percentages were larger than in 2005.

The percentage of four-year mathematics departments entering into dual-enrollment agreements increased from 14% in 2005 to 17% in 2010. At four-year mathematics departments, the biggest gain in dual enrollments was in Elementary Statistics, which went from 1,321 total dual enrollments in fall and spring 2005 to 5,818 total dual enrollments in fall and spring 2010 (a 340% increase). College Algebra increased from 10,719 total dual enrollments in fall and spring 2005 to 16,992 total dual enrollments in fall and spring 2010 (a 59% increase), and Precalculus increased from 3,541 total dual enrollments in fall and spring 2005 to 5,136 total dual enrollments in fall and spring 2010 (a 45% increase). However, Calculus I dual enrollments dropped from 14,030 total dual enrollments in fall and spring 2005 to 10,025 total dual enrollments in fall and spring 2010 (a 29% decrease). Dual enrollments in other courses went from 4,193 in 2005 to 4,891 in 2010. Dual enrollments still account for a small percentage of four-year mathematics department enrollments; e.g. in 2010 they were about 4% of College Algebra fall enrollments, 2% of Precalculus fall enrollments, and 1% of both Calculus I and Statistics fall enrollments. In 2005, dual enrollments were 4% of all fall enrollments.

The fact that two-year mathematics programs offer vastly more dual-enrollment courses and credits than do four-year college and university mathematics departments does not mean that the impact of dual-enrollment programs is primarily in two-year colleges. Many students with dual-enrollment credit go directly from high school to four-year colleges and universities, taking the dual-enrollment credit awarded by the two-year college with them. In many states, public four-year colleges and universities are required by law to accept such credit.

A major concern in dual-enrollment courses is the degree of quality control exercised by the department through which college-level credit for the courses is awarded. The lower portion of Table SP.18 examines several kinds of control that the college-level departments might have had over their dual-enrollment courses in fall 2010 and presents a comparison to 2005. Table SP.18 indicates that four-year institutions have increasing influence over dual-enrollment courses as the category of "never" exercising control dropped from 2005 to 2010 for all questions except for "syllabus" (where the percentage of "never" was already low). The percentages for four-year departments were closer to those in two-year departments in 2010 than in 2005. The largest difference in 2010 was that the choice of textbook was always controlled by the department at 71% of two-year mathematics programs and 45% of four-year departments. Final

TABLE SP.18 Percentage of departments offering dual-enrollment courses taught in high school by high school (HS) teachers, enrollments in various dual-enrollment courses in spring 2010 and fall 2010 compared to total of all other enrollments in fall 2010, and (among departments with dual-enrollment programs) percentage of various departmental controls over dual-enrollment courses, by type of department. (Fall 2005 data in parentheses.) The comparable data in the CBMS2005 report is in Table SP.16.

	Four-year Mathematics			Two-year Mathematics			Four-year Statistics		
Percentage of departments with dual-enrollment courses	17% (14%)			61% (50%)			8% (8%)		
Number of dual enrollments in:	Dual Enrollments		Other enrollments	Dual enrollments		Other enrollments	Dual enrollments		Other enrollments
	spring 2010	fall 2010	fall 2010	spring 2010	fall 2010	fall 2010	spring 2010	fall 2010	fall 2010
College algebra	5312	11680	251495	21955	30873	230034			
Precalculus	3184	1952	114256	20847	22931	60998			
Calculus I	5449	4576	334791	9557	10974	85696			
Statistics	3451	2367	208546	7521	4247	134273	1573	0	76702
Other	2725	2166		17413	11779				
Dept. control of dual enroll. courses taught by HS teachers	Never	Sometimes	Always	Never	Sometimes	Always	Never	Sometimes	Always
Textbook choice	18% (41%)	38% (15%)	45% (44%)	14% (14%)	15% (12%)	71% (74%)	38% (36%)	31% (30%)	31% (34%)
Syllabus design/ approval	3% (2%)	2% (6%)	95% (92%)	3% (4%)	1% (7%)	96% (89%)	38% (36%)	62% (0%)	0% (64%)
Final exam design	22% (40%)	32% (30%)	46% (30%)	31% (36%)	28% (28%)	41% (37%)	38% (100%)	62% (0%)	0% (0%)
Choice of instructor	17% (32%)	24% (20%)	59% (48%)	33% (35%)	20% (13%)	47% (52%)	38% (36%)	31% (0%)	31% (64%)
Departmental teaching evaluations required in dual-enrollment courses			40% (16%)			48% (64%)			0% (0%)

TABLE SP.19 Percentage of departments in four-year colleges and universities and in public two-year colleges that assign their own full-time or part-time faculty members to teach, in high school, courses that award both high school and college credit, and number of students enrolled, in fall 2010. (Fall 2005 data in parentheses.) This table was Table SP.17 in CBMS2005.

	Four-year Mathematics Departments	Two-year Mathematics Departments	Statistics Departments
Assign their own members to teach dual-enrollment courses	4% (4%)	22% (12%)	0%
Number of students enrolled	3932 (2874)	6358 (2008)	na

exam design was always under the control of the department at 46% of the four-year colleges and 41% of the two-year colleges, and the choice of instructor was under the control of the department at 59% of the four-year colleges and 47% of the two-year colleges. The percentage of programs requiring teaching evaluations in dual-enrollment courses at two-year colleges dropped from 64% in 2005 to 48% in 2010; at mathematics departments at four-year colleges and universities, this percentage increased from 16% in 2005 to 40% in 2010.

In spite of some of the issues raised in the preceding paragraph, as reported in Table TYF.25 in Chapter 7, among all two-year college survey respondents (including respondents from two-year colleges that do not have dual-enrollment arrangements), 11% of mathematics program heads in two-year colleges saw dual-enrollment courses as a major problem, up six points from 2005. Another 16% found dual-enrollment arrangements somewhat of a problem, down five points from 2005.

Table SP.19 examines the practice of colleges and universities sending their own faculty members into high schools to teach courses that grant both high school and college credit. Although the number of students involved in these courses is smaller than the enrollment in dual-enrollment courses, these programs have grown as compared to 2005 at two-year colleges. In fall 2010, 22% of two-year and 4% of four-year institutions assign and pay their own faculty to teach courses in a high school that awards both high school and college credit. A two-year college faculty member teaching a dual-enrollment course usually was classified as a part-time faculty member at the two-year college that awarded college credit for the course, even though the salary was paid completely by a third party, e.g., the local school district. These direct-pay faculty members at two-year colleges taught 6,358 students in 2010; in 2005, 2,008 students were enrolled in courses for dual high school and college credit taught by two-year college faculty.

Tables SP.20 to SP.24: Curricular Requirements of Mathematics and Statistics Majors in the U.S.

Requirements for a major in mathematics have become more flexible, as can be seen, for example, in the MAA's Committee on Undergraduate Programs in Mathematics (CUPM) recommendations on requirements for the mathematics major [CUPM]. Departments seem to have more tracks (sets of graduation requirements) and more flexible requirements for mathematics majors. The CBMS 2005 survey asked about these requirements, and these questions were repeated in the 2010 survey. In addition, in 2010, departments were asked about the number of different tracks in their major. Table SP.20 summarizes the data on whether various courses were required in all of their majors, in some but not all of their majors, or in none of their majors; these numbers are broken down by the level of the department.

Table SP.20 shows that, in fall 2010, the requirement selected most frequently as being required for all mathematics majors was "at least one computer science course" (required by more than 60% of departments at all levels); the percentage of mathematics departments requiring a statistics course for all majors increased at the doctoral and bachelors-level departments (in the bachelors-level departments, it went from 32% to 55%) from 2005 to 2010.

Historically, Modern Algebra and Real Analysis have been considered required courses for all mathematics majors, and there has been some concern about changes in these requirements (see, e.g., [B3]). Table SP.20 shows that these courses are not required of <u>all</u> mathematics majors in 2010, although the percentages of departments requiring these two

TABLE SP.20 Percentage of four-year mathematics departments requiring certain courses (or exit exam) in all, some, or none of their majors, by type of department, in fall 2010. These percentages can be compared to Table SP.19 in CBMS2005.

	Required in all majors			Required in some but not all majors			Not required in any major		
Mathematics Department Requirements	Univ (PhD) %	Univ (MA) %	College (BA) %	Univ (PhD) %	Univ (MA) %	College (BA) %	Univ (PhD) %	Univ (MA) %	College (BA) %
Modern Algebra I	39	47	62	39	46	27	21	7	11
Real Analysis I	51	46	36	34	36	28	15	18	36
Modern Algebra I or Real Analysis I (major may choose either to fulfill this requirement)	18	20	6	29	17	20	53	63	73
A one-year upper-level sequence	42	49	31	26	11	16	32	40	53
At least one computer science course	61	65	73	18	21	13	21	14	15
At least one statistics course	44	37	55	27	47	25	29	16	20
At least one applied mathematics course beyond course E21	17	32	29	39	32	14	44	36	57
A capstone experience (senior project, thesis, seminar, internship)	30	57	75	19	16	7	50	28	18
An exit exam (written or oral)	10	11	23	2	4	4	88	86	73

courses for all majors generally increased in 2010 over 2005. Of these two courses, Modern Algebra I was a more popular required course at bachelors-level departments (required for all majors at 62% of bachelors-level departments), while Real Analysis I was more frequently required of all majors at doctoral-level departments (required for all majors at 51% of the doctoral-level departments).

Modern Algebra I is not required in any major at 21% of the doctoral-level, 7% of the masters-level, and 11% of the bachelors-level departments, while Real Analysis I is not required in any major at 15% of the doctoral-level, 18% of the masters-level, and 36% of the bachelors-level departments (these percentages are generally slightly up from 2005). In the 2010 survey, the two options “Modern Algebra 1 plus another upper divisional algebra course” and “Real Analysis 1 plus some other upper division analysis course” from the 2005 survey were replaced with two new options: “Modern Algebra I or Real Analysis I (major may choose either to fulfill this requirement)” and “a one-year upper level sequence”. The option of choosing one of the two courses was required for all majors at 18% of doctoral, 20% of masters, and only 6% of bachelors-level departments.

Some departments are finding ways to create some depth in their mathematics major without requiring particular mathematics courses. A one-year upper-level sequence was required for all majors in 42% of doctoral-level departments, 49% of masters-level departments, and 31% of bachelors-level departments. A capstone experience (senior project, thesis, seminar,

TABLE SP.21 Percentage of statistics departments requiring certain courses (or exit exam) in all, some, or none of their majors, by type of department, in fall 2010. This table can be compared to Table SP.20 in CBMS2005.

	Required in all majors		Required in some but not all majors		Not required in any major	
Percentage of statistics departments that require:	Univ (PhD) %	Univ (MA) %	Univ (PhD) %	Univ (MA) %	Univ (PhD) %	Univ (MA) %
(a) Calculus I	92	91	6	9	2	0
(b) Calculus II	92	91	6	9	2	0
(c) Multivariable Calculus	69	55	22	27	9	18
(d) Linear algebra/Matrix theory	79	64	15	27	5	9
(e) At least one Computer Science course	60	91	16	0	24	9
(f) At least one applied mathematics course, not incl. (a), (b), (c), (d)	19	64	21	18	59	18
(g) A capstone experience (e.g., a senior thesis or project, seminar, or internship)	43	55	10	9	47	36
(h) An exit exam (oral or written)	10	18	4	0	87	82
(i) One Probability Course	81	91	13	9	6	0
(j) One Mathematical Statistics Course	79	64	12	36	8	0
(k) One Linear Models Course	56	55	13	18	31	27
(l) One Bayesian Inference Course	3	0	10	0	86	100

TABLE SP.22 Percentages of four-year mathematics departments offering varying numbers of tracks in their major, by level of department, in fall 2010.

	Mathematics Departments			
Number of tracks	Univ (PhD) %	Univ (MA) %	College (BA) %	Total %
One or two tracks	26	34	72	60
Three or four tracks	37	46	21	27
More than four tracks	37	17	5	11

Some totals are less than 100% due to round-off.

internship) was required for all majors at 75% of all bachelors-level departments (up from 59% in 2005).

The percentages of departments requiring the options described in the CBMS2010 survey instrument for some of their majors were generally lower than in 2005, and the percentage of departments requiring the given options in none of their majors were generally larger (one exception being the capstone experience), perhaps indicating that in 2010, departments offered tracks for the major with fewer requirements than in 2005. Table SP.22 gives the number of tracks in the major broken down by type of department (this question was new to the CBMS survey in 2010). In fall 2010, 72% of bachelors-level departments and 26% of doctoral-level departments had only one or two tracks in their major, while 37% of doctoral-level departments and 5% of bachelors-level departments had more than four tracks.

Table SP.21 examines requirements for an undergraduate statistics major awarded by statistics departments. Four new options were added in the 2010 survey: “One Probability Course”, “One Mathematical Statistics Course”, “One Linear Models Course”, and “One Bayesian Inference Course”. The options offered in 2005 were required at about the same rates in 2010 as in 2005 with the exception of Multivariable Calculus and Linear Algebra. These two courses were required for all majors by somewhat fewer departments, and required for some but not all majors at more departments; Multivariable Calculus was still required for all statistics majors at 69% of the doctoral-level statistics departments, and Linear Algebra was required for all statistics majors at 79% of the doctoral-level statistics departments. Linear Models was required for all statistics majors at about 55% of statistics departments, while a Bayesian inference course was required by only 3% of doctoral-level statistics departments.

Tables SP.23 and SP.24: Availability of Upper-level Courses in Mathematics and Statistics

Concerns about the availability of upper-level courses in mathematics and statistics led to questions on the 2000 and 2005 CBMS surveys, and this issue was addressed again in 2010. Generally the availability of upper-level courses improved in 2010 and, as was noted in Chapter 1, enrollments in upper-level courses were up in 2010 over 2005.

Table SP.23 examines the availability of many upper-division mathematics courses offered in mathematics departments at least once during the two academic years 2009-2010 and 2010-2011, and Table SP.24 examines the same question for upper-division statistics courses offered in mathematics and statistics departments. For mathematics courses, Table SP.23 shows that over all mathematics departments combined, the percentage of departments offering specific upper-division courses was up for almost every course, and the increase was particularly large for many courses at the bachelors-level departments. For example, in the 2005 survey, Modern Algebra I was reported as being offered by 52% of the bachelors-level departments within a two-year period, while in the 2010 survey that percentage rose to 76%. Advanced Calculus/Real Analysis also jumped from being offered at 57% of the bachelors-level departments in the 2005 survey to 75% in the 2010 survey. Second semester undergraduate courses were up at the doctoral-level departments; for example, Modern Algebra II was offered by 40% of the doctoral-level departments in 2005 and in 59% of the doctoral-level departments in 2010. Similarly, Advanced Calculus/Real Analysis II went from being offered at 62% of the doctoral-level departments in the 2005 survey to 71% in the 2010 survey. Mathematics Senior Seminar/Independent Study increased from 45% of all math-

TABLE SP.23 Percentage of mathematics departments offering various upper-division mathematics courses at least once in the two-academic years 2009-2010 and 2010-2011, plus historical data on the two year period 2004-2006, by type of department. The table can be compared to Table SP.22 in CBMS2005.

		Academic Years 2009-2010 & 2010-2011			
Upper-level mathematics courses	All Math Depts 2004-2006 %	All Math Depts 2009-2011 %	PhD Math %	MA Math %	BA Math %
Modern Algebra I	61	80	85	96	76
Modern Algebra II	21	27	59	49	16
Number Theory	37	51	72	61	45
Combinatorics	22	27	61	53	15
Actuarial Mathematics	11	13	22	23	10
Foundations/Logic	11	11	23	13	8
Discrete Structures	14	30	26	37	30
History of Mathematics	35	49	52	69	45
Geometry	55	74	83	78	71
Math for Secondary Teachers	37	35	35	62	30
Adv Calculus/ Real Analysis I	66	79	94	86	75
Adv Calculus/Real Analysis II	26	31	71	50	20
Adv Mathematics for Engineering/Physics	16	12	41	19	5
Advanced Linear Algebra	19	23	61	48	11
Introduction to Proofs	na	57	73	77	50

TABLE SP.23 (continued) Percentage of mathematics departments offering various upper-division mathematics courses at least once in the two academic years 2009-2010 and 2010-2011, plus historical data on the two-year period 2004-2006, by type of department. The table can be compared to Table SP.22 in CBMS2005.

		Academic Years 2009-2010 & 2010-2011			
Upper-level math courses, continued	All Math Depts 2004-2006 %	All Math Depts 2009-2011 %	PhD Math %	MA Math %	BA Math %
Vector Analysis	9	11	26	15	7
Advanced Differential Equations	13	16	48	24	8
Partial Differential Equations	19	26	74	56	11
Numerical Analysis I and II	47	42	84	63	31
Applied Math/Modeling	26	37	60	41	33
Complex Variables	37	44	80	65	33
Topology	32	25	65	40	15
Mathematics of Finance	8	12	29	16	7
Codes & Cryptology	8	11	22	11	9
Biomathematics	8	12	36	21	5
Operations Research	12	17	31	27	13
Math senior seminar/Ind study	45	65	67	85	61
All other advanced-level mathematics	na	25	46	43	17

TABLE SP.24 Percentage of mathematics and statistics departments offering various undergraduate statistics courses at least once in two academic years 2004-2005 and 2005-2006 and at least once in the two academic years 2009-2010 and 2010-2011, by type of department. This table can be compared to Table SP.23 in CBMS2005.

		AY 2009-10 & 2010-11					AY 2009-10 & 2010-2011		
Upper-level statistics courses	All Math Depts 2004-2006 %	All Math Depts %	PhD Math %	MA Math %	BA Math %	All Stat Depts 2004-2006 %	All Stat Depts %	PhD Stat %	MA Stat %
Mathematical Statistics	38	42	51	49	40	76	78	85	62
Probability	51	37	57	33	33	86	63	60	69
Combined Probability and Statistics	na	26	33	34	23	na	37	33	46
Stochastic Processes	6	9	33	7	5	43	37	40	31
Applied Statistical Analysis	13	13	25	18	10	65	50	52	46
Experimental Design	6	10	13	26	6	54	51	50	54
Regression & Correlation	6	11	21	15	8	62	71	65	85
Biostatistics	4	4	10	7	3	25	27	22	38
Nonparametric Statistics	2	5	11	12	2	38	30	27	38
Categorical Data Analysis	1	1	5	3	0	21	31	27	38
Sample Survey Design	4	2	6	4	1	49	41	42	38
Stat Software & Computing	3	5	14	10	2	43	na	na	na
Stat Computing	na	na	na	na	na	na	41	35	54
Stat Software	na	na	na	na	na	na	35	32	43
Data Management	0	1	2	0	1	5	10	5	23
Bayesian Statistics	na	na	na	na	na	na	36	31	50
Statistical Consulting	na	na	na	na	na	na	29	17	63
Senior Seminar/ Independent Study	3	12	9	15	11	41	44	43	46

Note: 0 means less than one-half of one percent.

ematics departments combined that reported it as being offered in the 2005 survey to 65% that reported it as offered in the 2010 survey.

Table SP.24 examines the analogous question for statistics courses offered in mathematics departments and statistics departments. The list of statistics courses was revised in 2010, increasing the number of upper-divisional statistics offerings for undergraduates that could be reported in statistics departments. Upper-level course offerings in probability were down in both mathematics and statistics departments, but other offerings were reasonably comparable. Over the past ten years, the offering of Mathematical Statistics has decreased: in the 2000 survey it was offered by 52% of mathematics departments and 90% of statistics departments, but in 2010, it was offered by 42% of mathematics departments and 78% of statistics departments. In Chapter 3, Table E.3 will show that while enrollments in elementary statistics courses have increased dramatically, enrollments in upper-level statistics courses have decreased in mathematics departments and increased in statistics departments, with the total from both departments down 6% in 2010 from the total in 2005 (though some of this change may be attributable to changes made in the expanded list of elementary-level statistics courses listed on the questionnaires).

Table SP.25: Estimates of Post-Graduation Plans of Graduates of Four-Year Mathematics Departments and Statistics Departments

Table SP.25 gives estimates from four-year mathematics departments and statistics departments of the post-graduation plans of their 2009-2010 graduating majors, broken down by the level of department. The estimates of the percentage of students taking jobs in business, government, etc. were slightly up at the bachelors and doctoral-level mathematics departments (but down at masters-level departments), while the percentages of students pursuing pre-college teaching were slightly down at bachelors and doctoral-level mathematics departments (but up at masters-level departments). In the 2010 survey (for the first time), the percentage of students who went to graduate school was broken into two parts: those going on to graduate study in mathematics and those doing graduate or professional study in an area outside of mathematics. The doctoral-level departments estimated that 10% of mathematics majors went to graduate or professional school outside of mathematics and 15% went to graduate school in mathematics; these estimates were 4% and 12% (resp. 8% and 17%) at masters (resp. bachelors) level mathematics departments. Using these reported percentages (15%, 12%, 17%) of mathematics

TABLE SP.25 Departmental estimates of the percentage of graduating mathematics or statistics majors from academic year 2009-2010 who had various post-graduation plans, by type of department, in fall 2010. (Data from fall 2005, when available, in parentheses.) 2005 data from Table SP.24 in CBMS2005.

	Mathematics Departments			Statistics Departments	
Departmental estimates of post-college plans	Univ (PhD) %	Univ (MA) %	College (BA) %	Univ (PhD) %	Univ (MA) %
Students who went into pre-college teaching	13 (16)	48 (44)	27 (32)	1 (1)	1 (0)
Students who went to graduate school in the mathematical or statistical sciences	15	12	17	23	29
Students who went to graduate or professional school outside of mathematics/statistics	10	4	8	5	5
Students who took jobs in business, government, etc.	27 (19)	19 (21)	30 (29)	41 (16)	45 (36)
Students who had other plans known to the department	5 (4)	3 (1)	4 (2)	2 (0)	3 (6)
Students whose plans are not known to the department	30 (39)	14 (18)	13 (17)	29 (65)	18 (28)

majors going to graduate school in mathematics and the number of majors (excluding computer science majors and mathematics education majors) reported in Chapter 3 Table E.1, the number of new graduate students would be estimated at 2,262 students. The 2010 Annual Survey reported the number of first-year, full-time, U.S. citizen graduate students (at masters and doctoral programs in mathematics and statistics) in fall 2010 to be 3,401 (2,809 excluding statistics) (2010 Annual Survey Supplemental Table GS.1). These numbers are not directly comparable for a number of reasons, including some first-year graduate students graduated in previous years and some majors may not be U.S. citizens, but this comparison indicates that the percentages of majors going to graduate work in mathematics reported in the CBMS survey are not unreasonable.

In the 2005 survey, 65% of the statistics departments' students post-graduation plans were unknown to the department; however, in the 2010 survey statistics departments had a clearer picture of their graduates' post-graduation plans, as only 29% of the students had unknown plans in 2010. A large percentage (41% from doctoral-level departments and 45% from masters-level departments) of statistics department graduates were estimated to take jobs in business, government, etc., and 23% of students from doctoral-level statistics departments and 29% of students from masters-level statistics departments were thought to have gone to graduate school in statistics. Only 1% of statistics graduates were estimated to have taken jobs in pre-college teaching.

Table SP.26: Assessment Activities in Four-Year Mathematics Departments and Statistics Departments

State governments, national accrediting agencies, and professional organizations such as the Mathematical Association of America have placed great emphasis on department assessment activities. In the 2005 CBMS survey, four-year mathematics and statistics departments were asked to identify which of a list of assessment activities they had performed over the last six years. This question was repeated in the 2010 CBMS survey, and a summary of the responses appears in Table SP.26. Most assessment activities were reported to have been used by a higher percentage of departments in 2010 than in 2005; for example, the use of outside reviewers was up at all levels of mathematics and statistics departments, and the study of data on students' progress in later courses was reported at higher rates in 2010 than in 2005 in most levels of mathematics and statistics departments. For all levels of mathematics and statistics departments, over 60% of departments reported that they had made changes to their undergraduate program based on assessment activities.

TABLE SP.26 Percentage of four-year mathematics and statistics departments undertaking various assessment activities during the last six years, by type of department, in fall 2010. (Data from fall 2005 in parentheses.) 2005 data from Table SP.25 in CBMS2005.

	Four-year Mathematics Departments			Statistics Departments	
Percentage using various assessment tools	Univ (PhD) %	Univ (MA) %	College (BA) %	Univ (PhD) %	Univ (MA) %
Consult outside reviewers	53 (47)	48 (45)	31 (29)	42 (37)	80 (59)
Survey program graduates	71 (62)	80 (81)	71 (74)	63 (54)	70 (71)
Consult other departments	54 (51)	45 (41)	26 (35)	47 (29)	60 (56)
Study data on students' progress in later courses	62 (45)	65 (52)	55 (38)	41 (30)	40 (56)
Evaluate placement system	72 (72)	51 (72)	60 (51)	12 (5)	30 (15)
Change undergraduate program due to assessment	78 (76)	76 (72)	69 (76)	61 (69)	80 (29)

Chapter 3

Mathematical Sciences Bachelors Degrees and Enrollments in Four-Year Colleges and Universities

Mathematics and statistics departments in the nation's four-year colleges and universities offer a wide spectrum of undergraduate mathematical sciences courses and majors, sometimes including mathematics education, actuarial science, operations research, and computer science, as well as mathematics and statistics. This chapter's fifteen tables describe:

- the number of bachelors degrees awarded through the nations' mathematics and statistics departments (Table E.1),
- enrollments in mathematical sciences courses (Tables E.2-E.4),
- the ranks of instructors who teach undergraduate courses in mathematics and statistics departments (Tables E.5-E.12),
- average class sizes and average sizes of recitation sections used in lecture/recitation classes (Tables E.13-E.14), and
- the numbers of new freshmen entering with AP credit in Calculus I or Elementary Statistics (Table E.15).

These tables are broken down by level of department based on the highest degree offered. The tables in this chapter expand upon Tables S.2 and S.4 from Chapter 1, while Chapter 5 provides additional detail about enrollments in first-year courses in mathematics and statistics. The enrollment in each course listed on the four-year mathematics and statistics questionnaires (both with, and without, distance-learning enrollments) are given in Appendix I; in making comparisons to previous CBMS surveys, one should note that previous Appendix enrollments included distance-learning enrollments. Enrollment data from two-year colleges appear in Chapter 6.

Highlights:

- The total number of mathematical sciences bachelors degrees granted through the nation's mathematics and statistics departments (combined) in the 2009-2010 academic year was down very slightly from 2004-2005; if degrees in computer science are removed, there was a 2% increase. See Table E.1.
- The total number of degrees awarded by statistics departments was up 36% in 2010 over 2005, while the total number of degrees awarded by mathematics departments was down about 1% (the number of bachelors degrees awarded in statistics by mathematics departments increased by 47%). In the 2009-2010 academic year, all levels of mathematics departments combined awarded more bachelors degrees in mathematics education and statistics, and fewer degrees in mathematics and computer science, than in 2004-2005. See Table E.1.
- Continuing a trend observed in the 2005 CBMS survey, the total number of degrees in the mathematical sciences awarded by doctoral-level mathematics departments increased (up 8% over 2005), while the total number of degrees awarded by masters-level and bachelors-level departments each decreased, although bachelors-level departments, by a narrow margin, awarded the greatest number of bachelors degrees in the mathematical sciences. See Table E.1.
- The percentage of bachelors degrees in the mathematical sciences awarded to women by mathematics and statistics departments combined in the 2009-2010 academic year was 43%, up from 40% in the 2004-2005 academic year, and the same as the percentage in the 1999-2000 academic year; this percentage was up in mathematics departments and down in statistics departments over the respective percentages in 2005. See Table E.1.
- Reversing a trend reported in 2005, total fall 2010 enrollments (including distance-learning enrollments) in mathematics departments were up 25%, and in statistics departments, enrollments were up 40%; the 2005 study reported a 3% decrease in mathematics department enrollments and a 5% increase in statistics department enrollments in fall 2005 over fall 2000. Increases in enrollments occurred at almost all levels of departments and types of courses – including mathematics department computer science enrollments, which were up 35%, and mathematics department statistics enrollments, which were up 44%. In fall 2010, total enrollments in bachelors-level departments exceeded those in doctoral-level departments. See Table E.2.

- The large increase in enrollments was not due to increases at the lowest levels of mathematics courses, as enrollments in precollege and introductory-level mathematics courses (combined) were up 18%. In fact, the enrollments in precollege-level courses at four-year mathematics departments remained about the same in 2010 as in 2005. See Table E.2.
- Statistics enrollments made major increases in both mathematics and statistics departments, as enrollments in elementary statistics courses taught in mathematics departments were up 56%, and enrollments in elementary statistics courses taught in statistics departments were up 50%. Advanced-level statistics course enrollments showed slower growth. See Table E.2.
- Enrollments in calculus-level courses (which include courses in linear algebra, differential equations, and discrete mathematics, as well as calculus courses of various kinds) rose 27% in 2010 over 2005. See Table E.2.
- In mathematics departments, enrollments in advanced-level mathematics courses were up 34% and, in statistics departments, enrollments in advanced-level statistics courses were up 17% in 2010 over 2005. In mathematics departments, advanced-level statistics enrollments decreased by 6%, though some of that decline may be due to changes in the 2010 questionnaire. See Table E.2.
- Distance-learning courses were defined to be "those courses in which the majority of the instruction occurs with the instructor and the students separated in time and/or space (e.g. courses in which the majority of the course is taught online, or by computer software, by television, or by correspondence)." Enrollments in distance-learning courses were up in 2010 over 2005 for each course category reported in 2005, at each level of the four-year department, with the total distance-learning enrollments in all course categories combined nearly double that of 2005. In fall 2010, in mathematics departments of four-year departments, distance-learning enrollments represented 4% of precollege enrollments, 3% of college algebra, trigonometry and pre-calculus (combined) enrollments, 0.6% of Calculus I enrollments, and 6% of elementary statistics enrollments. In statistics departments, 5% of the elementary statistics enrollment was taught in distance-learning format. All of these percentages are increases over 2005. See Table E.4.
- Across all levels of four-year mathematics departments, the percentage of sections known to be taught by tenured, tenure-eligible, or permanent faculty was slightly up in fall 2010 over fall 2005, with the one exception of computer science courses taught within mathematics departments, where the percentage of sections taught by part-time instructors almost doubled. However, in 2010, the percentage of sections of mathematics and statistics courses taught by an instructor of unknown rank generally increased, so it is difficult to make definitive statements regarding changes in the distribution of the ranks of course instructors. See Tables E.5-E.12.
- Not much change was reported in the average size of course sections. The average size of sections of calculus increased from 32 students in fall 2005 to 34 students in fall 2010, while the average size of sections of elementary statistics classes taught in mathematics and statistics departments combined decreased from 35 students in fall 2005 to 33 students in 2010. The size of computer science classes taught in mathematics departments increased. See Table E.13.
- The size of recitation sections of calculus courses increased from fall 2005 to fall 2010, more than doubling in Mainstream Calculus II at bachelors-level departments. The average size of recitation sections in elementary statistics courses taught in mathematics and statistics departments decreased slightly except at bachelors-level mathematics departments and masters-level statistics departments, where it increased significantly from fall 2005 to fall 2010. See Table E.14.
- Across all mathematics departments, the average percentage of freshmen receiving AP credit for Calculus I was 5% (13% across doctoral-level departments). Across all statistics departments, the average percentage of freshmen receiving AP credit for Elementary Statistics was 12%. See Table E.15.

Terminology: The two preceding CBMS survey reports are called CBMS2000 and CBMS2005.

In the CBMS2010 survey, the term "mathematics department" included departments of mathematics, applied mathematics, mathematical sciences, and departments of mathematics and statistics. The term "statistics department" referred to departments of statistics that offered undergraduate statistics courses. The term "mathematical sciences courses" covered all courses that were taught in mathematics or statistics departments in the United States; it included courses in mathematics education, actuarial sciences, and operations research taught in a mathematics or statistics department, as well as courses in mathematics, applied mathematics, and statistics. Computer science courses (and majors) were included in CBMS2010 totals when the courses (and majors) were taught (granted through) a mathematics department (previous CBMS surveys gathered data on computer science courses/majors offered through statistics departments, but this data was not collected in 2010). CBMS2010 data did not include any courses or majors that were taught in, or granted through, separate departments of computer science, actuarial science, operations research, etc. Departments were classified by the highest degree offered. For example, the term "bachelors-level department" refers to one that did not offer masters or doctoral degrees.

Table E.1: Bachelors degrees granted between July 1, 2009 and June 30, 2010

The total number of mathematical sciences bachelors degrees granted through the nation's mathematics and statistics departments in the 2009-2010 academic year was 21,377, very slightly down from 21,437 in 2004-2005, despite the fact that overall fall enrollments rose by about 23% during that same period (see Table S.1 in Chapter 1). The previous five CBMS surveys (see Table S.3 in Chapter 1) reported a declining trend in the total number of bachelors degrees awarded by the nation's mathematics and statistics departments and, over the past 25 years, that number has decreased by 13%. However, when computer science degrees are removed from the count, the number of degrees awarded by mathematics and statistics departments has remained relatively constant: 19,380 degrees in 1989-1990 and 19,241 degrees in 2009-2010 (see Table S.3).

Table E.1 shows that in 2009-2010, the number of bachelors degrees awarded by statistics departments was up 36% over 2004-2005. During the same period, the number of bachelors degrees awarded by mathematics departments was down about 1%. Most of the increase in the number of degrees awarded by statistics departments resulted from increases in the number of degrees awarded from masters-level statistics departments. Mathematics departments award most of the degrees in the mathematical sciences, 96% in 2009-2010, so the number of degrees awarded by mathematics departments is the major component in the number of undergraduate degrees awarded in the mathematical sciences. Table E.1 breaks down the number of bachelors degrees offered by mathematics departments into the subcategories of degrees in mathematics (including actuarial science, operations research, and joint majors), mathematics education, statistics, and computer science.

As was already observed, much of the decline in the number of bachelors degrees awarded by mathematics departments can be attributed to the decline in the number of bachelors degrees awarded in computer science by mathematics departments. In 1994-1995 the CBMS study estimated that mathematics departments awarded 2,741 bachelors degrees in computer science, while Table E.1 shows that in 2009-2010 this number was 2,137, a 22% decline. Most of bachelors degrees awarded in computer science in 2009-2010 were given by the bachelors-level departments. As will be noted later, while recent CBMS surveys have reported decreasing enrollments in computer science courses taught within mathematics departments, the CBMS2010 study showed an increase in computer science enrollments in mathematics departments for fall 2010 over the fall 2005 computer science enrollments reported in CBMS2005 (see Table E.2).

Table E.1 shows that the number of bachelors degrees in mathematics awarded by mathematics departments in 2009-2010 was 14,435 degrees. Earlier CBMS studies estimated that in 2004-2005 there were 14,610 degrees, in 1999-2000 there were 13,664 degrees, and in 1994-1995 there were 14,294 degrees awarded in mathematics by mathematics departments. Hence the number of bachelors degrees in mathematics awarded by mathematics departments in 2009-2010 is above that of 1994-1995. According to Table E.1, the number of bachelors degrees in statistics awarded by mathematics departments increased from 241 degrees in 2004-2005 to 354 degrees in 2009-2010, a 47% increase.

Table E.1 also breaks down the numbers of degrees offered in each subcategory by the level of department awarding the degree. Continuing an important trend noted in the 2005 CBMS survey, most of the growth in the number of bachelors degrees awarded in mathematics occurred at the doctoral-level mathematics departments. In 2005, for the first time, the number of bachelors degrees in mathematics granted by doctoral-level departments exceeded the number granted by bachelors-level departments. In 2004-2005, doctoral-level departments awarded 44% of the bachelors degrees in mathematics; in 2009-2010, this percentage rose to 51%. The number of bachelors degrees in mathematics awarded by bachelors-level departments decreased from 5,839 in 2004-2005 to 5,167 in 2009-2010, and for the masters-level departments the number decreased from 2,377 degrees in 2004-2005 to 1,965 degrees in 2009-2010. Figure E.1.2 shows the number of bachelors degrees awarded in computer science, mathematics education, and mathematics and statistics (combined) in 1999-2000, 2004-2005, and 2009-2010, broken down by level of department. Figures E.1.3 and E.1.4 show the percentages of mathematical sciences bachelors degrees granted by mathematics and statistics departments in 1999-2000, 2004-2005, and 2009-2010, broken down by the level of department. Figure E.1.3 includes computer science degrees while Figure E.1.4 does not. Data from CBMS1995, CBMS2000, and CBMS2005 showed that bachelors-level departments consistently produced at least 40% of the non-computer science bachelors degrees granted through mathematics departments; however, the 2010 study showed that this percentage has fallen to 37% in 2009-2010. Bachelors-level departments remain

TABLE E.1 Bachelors degrees in mathematics, mathematics education, statistics, and computer science in mathematics departments and in statistics departments awarded between July 1, 2009 and June 30, 2010, by gender of degree recipient and type of department.

	Mathematics Departments				Statistics Departments			
Bachelors degrees in Math and Stat Depts	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts	Total Math & Stat Depts
Mathematics majors (including Act. Sci., Oper. Res., and joint degrees)								
Men	4735	1099	2685	8519				8519
Women	2568	866	2482	5916				5916
Percentage of women	*35%*	*44%*	*48%*	*41%*				*41%*
Total Math degrees	7303	1965	5167	14435				14435
Mathematics Education Majors								
Men	229	500	608	1337				1337
Women	341	896	1040	2277				2277
Percentage of women	*60%*	*64%*	*63%*	*63%*				*63%*
Total Math Ed degrees	570	1396	1648	3614				3614
Statistics Majors[1]								
Men	117	29	43	189	291	213	504	693
Women	99	41	25	165	190	144	334	499
Percentage of women	*46%*	*59%*	*37%*	*47%*	*40%*	*40%*	*40%*	*42%*
Total Stat degrees	216	70	68	354	481	357	838	1192
Computer Science majors								
Men	231	162	1350	1743				1743
Women	39	23	332	394				394
Percentage of women	*14%*	*12%*	*20%*	*18%*				*18%*
Total CS degrees	270	185	1682	2137				2137
Total degrees - Men	5312	1790	4686	11788	291	213	504	12291
Total degrees - Women	3047	1826	3879	8752	190	144	334	9086
Percentage of women	*36%*	*50%*	*45%*	*43%*	*40%*	*40%*	*40%*	*43%*
Total all degrees	8358	3616	8565	20540	481	357	838	21377

[1] The counts reported here include categories, such as joint majors, that are reported separately within Table S.3.

Note: Round-off may make row and column sums seem inaccurate.

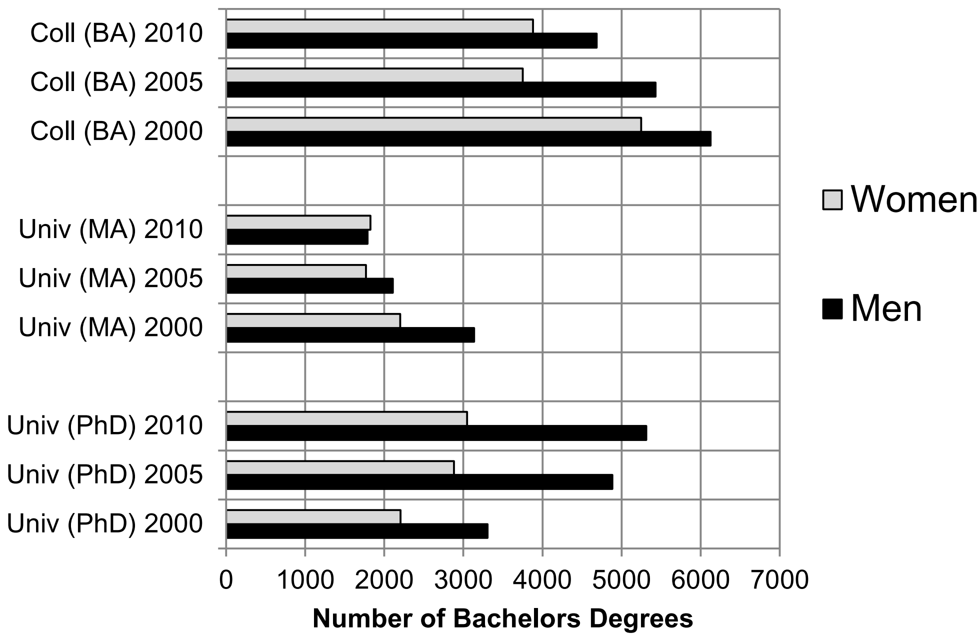

FIGURE E.1.1 Bachelors degrees in mathematics departments awarded between July 1 and June 30 in the academic years 1999-2000, 2004-2005, and 2009-2010, by gender and type of department.

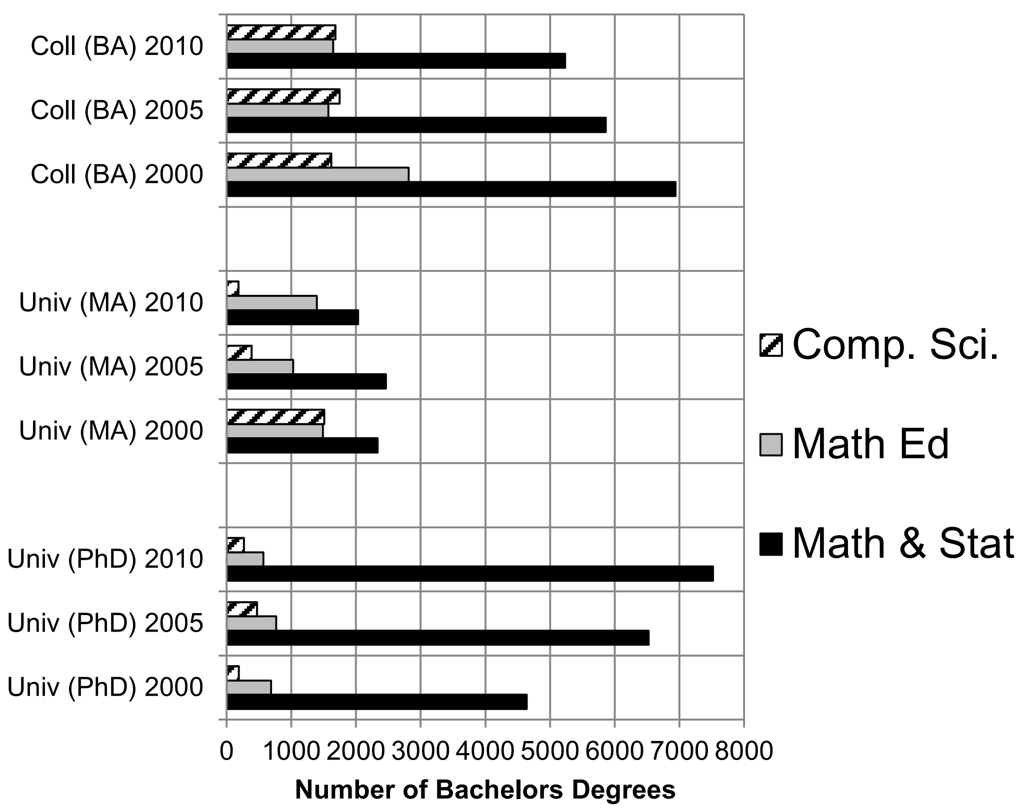

FIGURE E.1.2 Number of bachelors degrees granted in academic years 1999-2000, 2004-2005, and 2009-2010 by type of major and type of department.

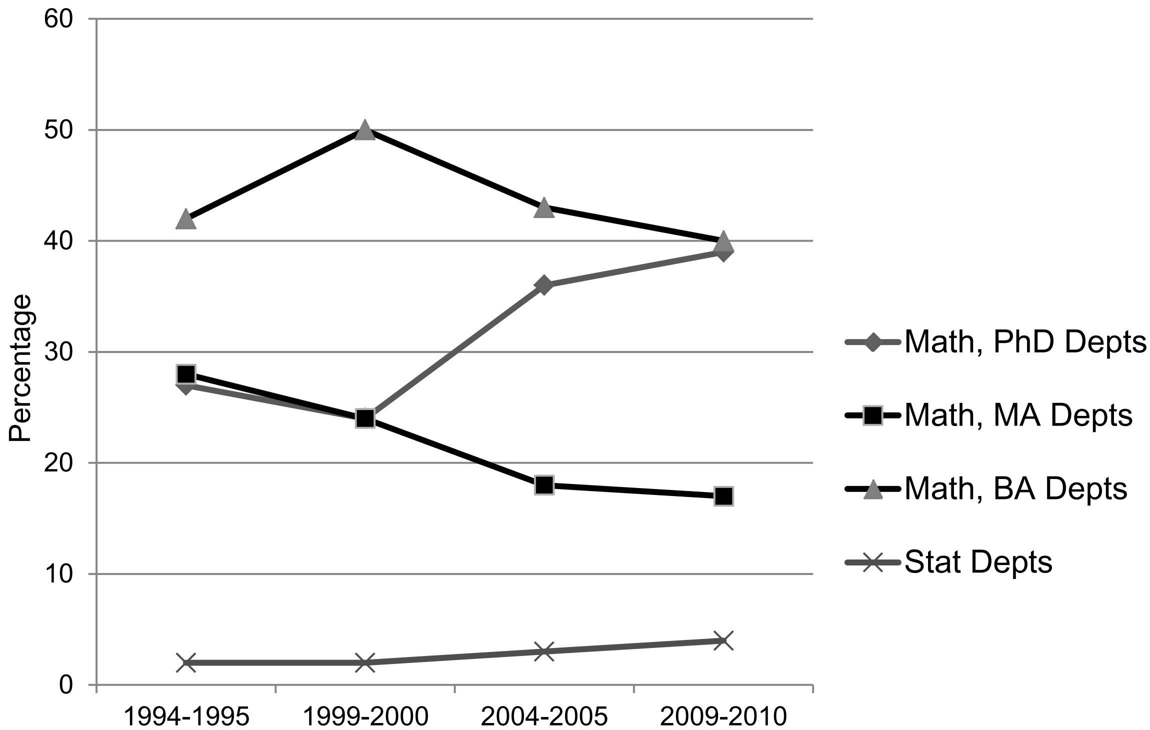

FIGURE E.1.3 Percentage of mathematical sciences bachelors degrees (including computer science) awarded through mathematics and statistics departments of various kinds in academic years 1994-1995, 1999-2000, 2004-2005, and 2009-2010.

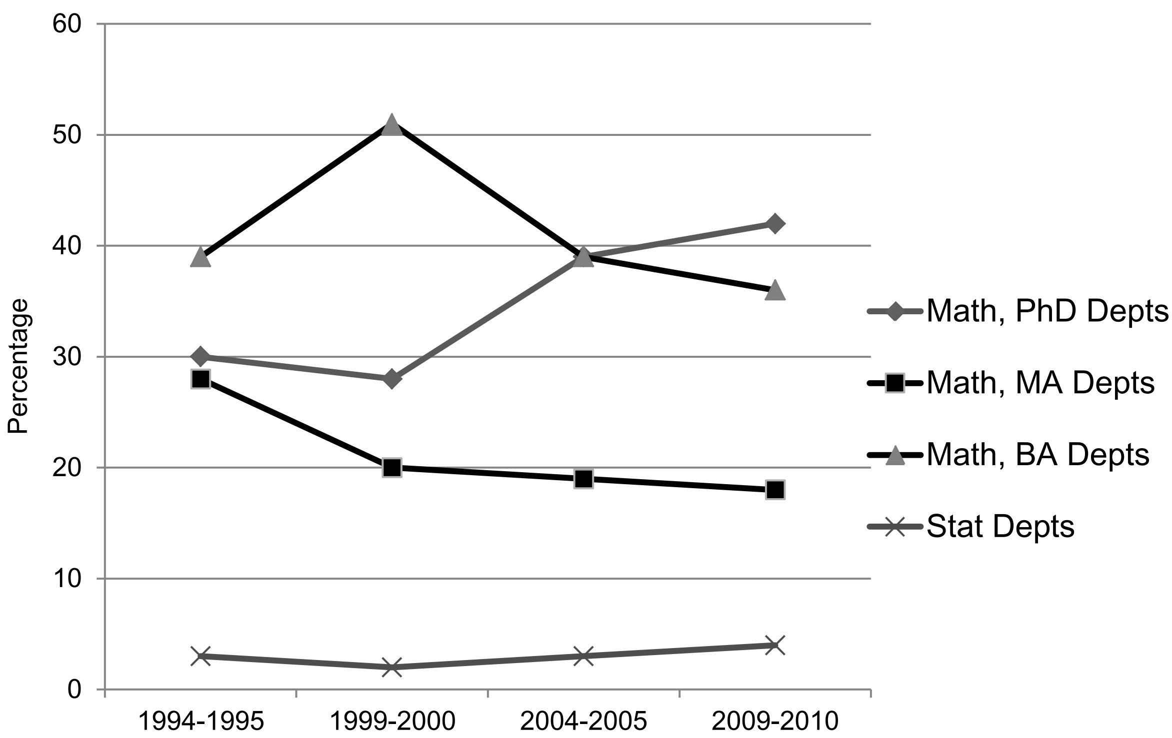

FIGURE E.1.4 Percentage of mathematical sciences bachelors degrees (excluding computer science) awarded through mathematics and statistics departments of various kinds in academic years 1994-1995, 1999-2000, 2004-2005, and 2009-2010.

the largest producer of total numbers of mathematical sciences degrees awarded, with 8,565 degrees awarded in 2009-2010, but the bachelors-level departments were only about 200 degrees awarded ahead of the doctoral-level departments (while in 2004-2005 bachelors-level departments held a roughly 1,400 total mathematical sciences degrees awarded advantage). Whether because of criteria in federal grant programs or because large universities offer more programs in engineering and other STEM disciplines that are attractive to students during difficult economic times, doctoral-level departments seem to be increasing producers of undergraduate mathematical sciences majors (see also [B4]).

Table E.1 shows that the number of degrees awarded by mathematics departments in mathematics education increased 7% from 2004-2005 to 2009-2010, rebounding after a large decline reported in 2004-2005. The number of mathematics education degrees awarded in 1994-1995 was 4,829 degrees, in 1999-2000 it was 4,991 degrees, in 2004-2005 it was 3,369 degrees, and in 2009-2010 it was 3,614 degrees. The increase in 2009-2010 over 2004-2005 resulted from increases within the masters-level and bachelors-level departments; the number of mathematics education degrees awarded from doctoral-level departments declined from 766 awarded in 2004-2005 to 570 awarded in 2009-2010. See Figure E.1.2.

Table E.1 shows that the total number of mathematical sciences degrees awarded to women was up at each level of mathematics and statistics department. The overall total percentage of undergraduate degrees awarded to women by mathematics and statistics departments combined in 2009-2010 was 43%, up from 40% in 2004-2005. The percentage of degrees awarded to women varies by the level of department. The percentage of the total number of mathematical sciences degrees awarded to women by the doctoral-level departments has been declining: in 1994-1995 the percentage of all undergraduate degrees awarded to women by doctoral-level mathematics departments was 43%, in 1999-2000 it was 40%, in 2004-2005 it was 37%, and in 2009-2010 it was 36%. In 2009-2010, the percentage of all degrees awarded to women was down slightly in the doctoral-level departments in both mathematics and statistics, but it was up at the other levels of departments. The percentage of women obtaining degrees also varies within the various subcategories of mathematics degrees; it is highest in mathematics education (in 2009-2010 it was 63%, up from 60% in 2004-2005). The percentages of degrees awarded to women were up in each category of degree awarded by the bachelors-level departments, and in 2009-2010 the percentage of undergraduate degrees awarded to women in mathematics was 48% at bachelors-level departments, compared to 35% at doctoral-level departments. The percentage of degrees awarded to women by statistics departments in 2009-2010 was 40%, down from 42% in 2004-2005. See Figure E.1.1.

Tables E.2 and E.3: Undergraduate enrollments and number of sections offered in mathematics and statistics departments

The CBMS2010 data show that enrollments in mathematical sciences courses were substantially larger in fall 2010 than in fall 2005, and these enrollments were up in almost every category. Table E.2 shows that the total enrollment in mathematical sciences courses (<u>including</u> distance-learning enrollments) taught in mathematics departments in fall 2010 was 231,000, up 25% from fall 2005. Table E.2 breaks enrollments down by broad categories of courses (mathematics courses, statistics courses, and computer science courses) and by levels of department. The enrollments of individual courses are given in Appendix I (where enrollments both with, and without, distance-learning enrollments can be found; in previous CBMS survey reports, Appendix I gave enrollments <u>with</u> distance-learning enrollments included). Enrollments in introductory-level, calculus, and elementary statistics courses are considered in more detail in Chapter 5 (where tables do not include distance-learning enrollments). When a table in this report concerns <u>sections</u> of a course, the corresponding enrollments do not contain distance-learning enrollments; otherwise, distance-learning enrollments are generally included.

Considering first the enrollments in mathematics courses, Table E.2 shows that the total national enrollment in mathematics courses in fall 2010 was roughly 1,971,000, up 23% from 1,607,000 in fall 2005. Mathematics courses are broken down into precollege courses, introductory courses (including precalculus), calculus-level courses (including linear algebra, differential equations, discrete mathematics, as well as various kinds of calculus), and advanced mathematics; each of these course grouping enrollments is broken down further by the level of the department. See Figure E.2.1. The biggest percentage growth in mathematics course enrollment was in advanced courses, which increased 34%, from an enrollment of roughly 112,000 in 2005 to an enrollment of 150,000 in 2010. The next largest growth in enrollment in fall 2010 over fall 2005 occurred in calculus-level courses, up 27%, followed by a 22% growth in enrollment in introductory-level courses, and only a 4% increase in enrollment in precollege-level mathematics courses. There was enrollment growth in all levels of departments. Enrollment in mathematics courses grew 12% at the doctoral-level departments, 28% at the masters-level departments, and 34% at the bachelors-level departments in fall 2010 over fall 2005. In 2010, total enrollment in

TABLE E.2 Enrollment (in thousands) in undergraduate mathematics, statistics, and computer science courses (including distance-learning enrollments) in mathematics and statistics departments by level of course and type of department in fall 2010. Numbers in parentheses are (2000, 2005) enrollments.

	Fall 2010 (2000, 2005) enrollments (in 1000s)						
	Mathematics Departments				Statistics Departments		
	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts
Mathematics Courses							
Precollege	57 (59,55)	64 (59,60)	88 (101,87)	209 (219,201)			
Introductory (incl. Precalc)	299 (258,269)	214 (227,190)	350 (238,248)	863 (723,706)			
Calculus level	383 (302,345)	145 (131,88)	221 (137,154)	748 (570,587)			
Advanced Mathematics	64 (43,52)	39 (24,24)	47 (35,36)	150 (102,112)			
Total Math courses	803 (662,720)	462 (441,362)	706 (511,525)	1971 (1614,1607)			
Statistics Courses							
Elementary Statistics	51 (38,30)	40 (35,32)	140 (63,86)	231 (136,148)	54 (46,42)	27 (8,13)	81 (54,54)
Upper Statistics	15 (12,15)	6 (12,9)	11 (11,10)	32 (35,34)	15 (17,20)	12 (3,3)	28 (20,24)
Total Stat Courses	66 (50,44)	45 (47,42)	151 (74,96)	262 (171,182)	70 (63,62)	39 (11,16)	109 (74,78)
Computer Science Courses							
Lower Computer Science	3 (5,3)	3 (33,11)	50 (52,30)	56 (90,44)			
Middle Computer Science	1 (1,1)	1 (7,1)	9 (9,6)	12 (17,8)			
Upper Computer Science	1 (2,1)	1 (6,1)	8 (8,3)	10 (16,5)			
Total CS courses	5 (8,5)	6 (46,13)	67 (69,39)	77 (123,57)			
Total all courses	874 (720,769)	513 (534,417)	924 (654,659)	2310 (1908,1845)	70 (63,62)	39 (12,18)	109 (75,80)

Note: Beginning in 2010, the CBMS Survey did not include computer science courses taught in statistics departments.

Note: Due to round-off, row and column sums may appear inaccurate.

bachelors-level mathematics departments exceeded that in doctoral-level departments; see Figure E.2.3.

Statistics enrollments showed large gains in both mathematics and statistics departments. In mathematics departments, Table E.2 shows that elementary statistics enrollments in fall 2010 were 231,000, up 56%, while advanced-level statistics enrollment in mathematics departments declined by 6% compared

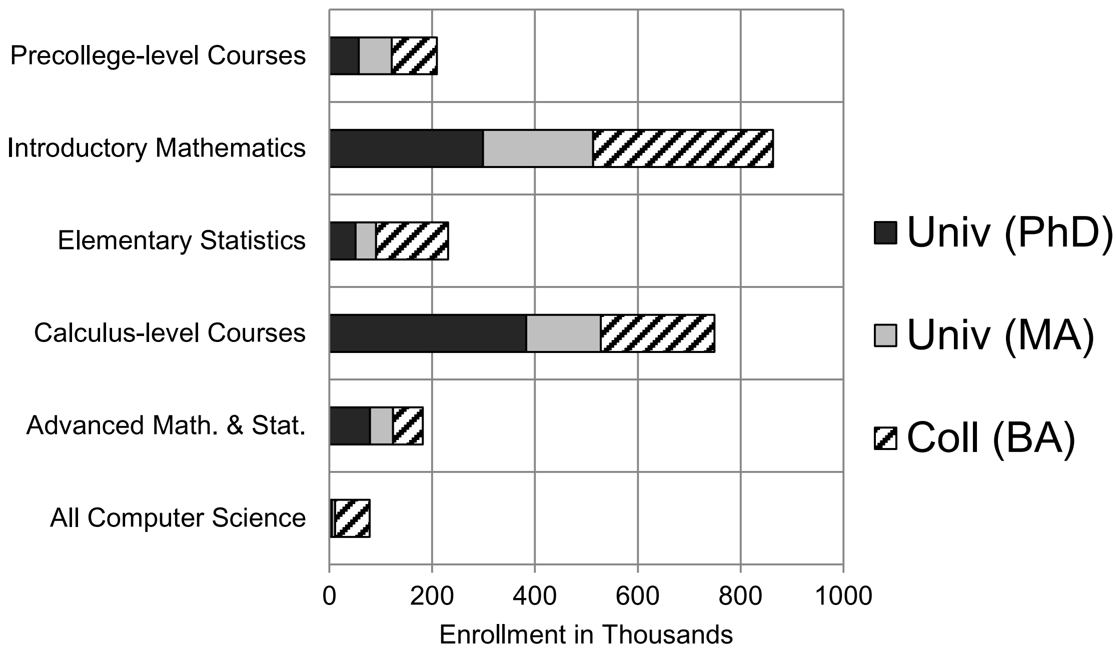

FIGURE E.2.1 Enrollment (in thousands) in undergraduate mathematics, statistics, and computer science courses in four-year college and university mathematics departments by type of course and type of department in fall 2010.

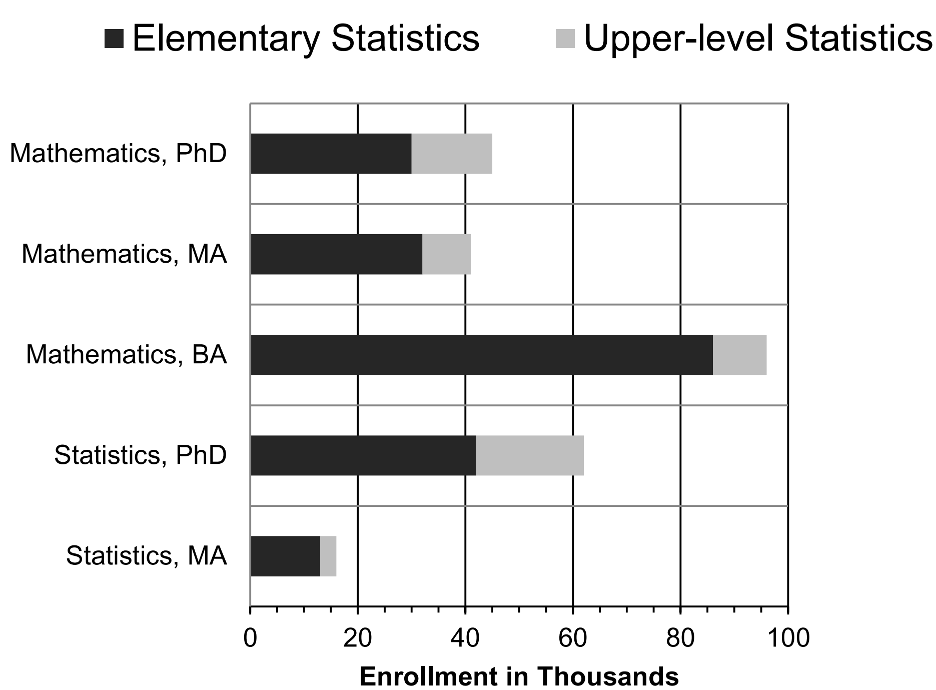

FIGURE E.2.2 Enrollment (in thousands) in undergraduate statistics courses by level of course and type of department in fall 2010.

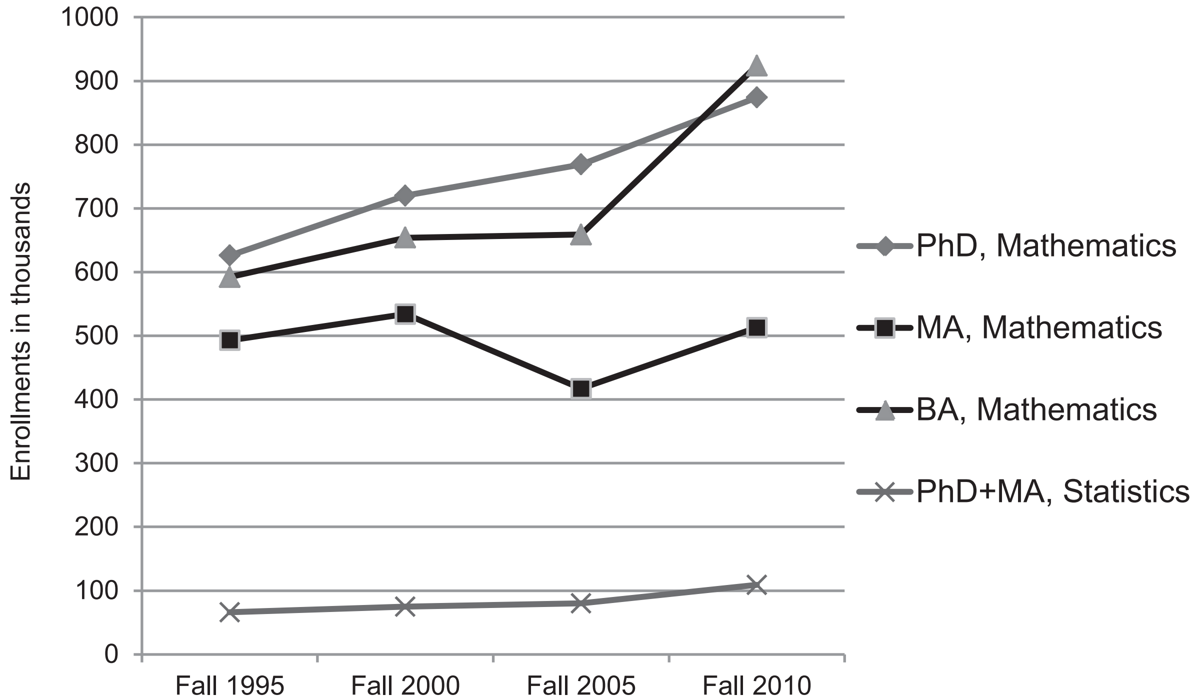

FIGURE E.2.3 Undergraduate enrollment (in thousands) by type of department in fall 1995, fall 2000, fall 2005, and fall 2010.

to fall 2005. Most of the elementary statistics that is taught in mathematics departments occurs at bachelors-level departments, where the fall 2010 enrollment in elementary statistics was roughly 140,000. In statistics departments, elementary statistics enrollments were 81,000, a little over one-third of that in mathematics departments, and up 50% over 2005. Enrollments in upper-level statistics courses grew 17% in statistics departments and were 28,000 in fall 2010, compared with the 32,000 enrollments in mathematics departments. See Figure E.2.2.

Computer science enrollments in mathematics departments are now largely confined to bachelors-level departments. These enrollments were up 35% to 77,000 in fall 2010 over fall 2005, despite the long-running trend of declining computer science enrollments, as more computer science courses are taught in computer science departments than in mathematics departments. Despite the increase in 2010, these enrollments are still well below the total enrollment of 123,000 reported for computer science courses taught in mathematics departments in fall 2000. Computer science course enrollments for courses offered in statistics departments were collected in past CBMS studies, but these enrollments had become so small that it was decided not to collect them in 2010. The computer science enrollments in mathematics departments, though small, are still significant in mathematics departments; as one example, according to Table E.2, in fall 2010 the bachelors-level departments had more total enrollments in computer science courses than in advanced-level courses.

Another way to measure changes in enrollment is to track the number of course sections that are offered. Table E.3 shows that from fall 2005 to fall 2010, overall, the total number of mathematics course sections grew 21%; the number of advanced-level mathematics course sections grew 35%, the number of calculus-level course sections grew 21%, the number of introductory-level course sections grew 21%, and the number of precollege-level course sections grew 3%. The total number of sections of mathematics courses grew 10% at the doctoral-level departments, 34% at the masters-level departments, and 21% at the bachelors-level departments.

Table E.3 shows the dramatic rise in the number of statistics course sections. Within mathematics departments, there was a 51% increase in the number of elementary statistics course sections offered. Following the drop in enrollment in upper-level statistics courses taught in mathematics departments, there was an 18% decline in the number of these course sections. In statistics departments, the

TABLE E.3 Number of sections (not including distance learning) of undergraduate mathematics, statistics, and computer science courses in mathematics and statistics departments by level of course and type of department in fall 2010 with fall 2005 figures in parentheses.

	Number of sections: Fall 2010 (Fall 2005)						
	Mathematics Departments				Statistics Departments		
	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts
Mathematics Courses							
Precollege level	1578	2075	3699	7352			
	(1363)	(1902)	(3862)	(7126)			
Introductory (incl. Precalc)	6268	6556	12525	25349			
	(5518)	(5543)	(9895)	(20955)			
Calculus	7976	4559	9575	22110			
	(7696)	(3237)	(7388)	(18321)			
Advanced Mathematics	3266	3304	3913	10483			
	(2625)	(1622)	(3507)	(7754)			
Total Math courses	19088	16494	29712	65294			
	(17202)	(12303)	(24652)	(54157)			
Statistics Courses							
Elementary Statistics	969	1208	5014	7191	1113	638	1751
	(629)	(924)	(3191)	(4744)	(696)	(186)	(882)
Upper Statistics	561	420	929	1910	461	447	907
	(869)	(714)	(771)	(2354)	(499)	(156)	(654)
Total Stat Courses	1530	1628	5943	9102	1573	1085	2658
	(1498)	(1638)	(3962)	(7098)	(1195)	(342)	(1537)
Computer Science Courses							
Lower Computer Science	101	146	2230	2477			
	(114)	(512)	(1629)	(2254)			
Middle Computer Science	51	92	769	912			
	(61)	(121)	(739)	(921)			
Upper Computer Science	49	69	741	859			
	(61)	(83)	(444)	(587)			
Total CS courses	201	307	3740	4248			
	(236)	(715)	(2811)	(3762)			
Total all courses	20820	18428	39396	78644	1573	1085	2658
	(18935)	(14656)	(31425)	(65017)	(1208) [1]	(378) [1]	(1586) [1]

[1] Includes Computer Science sections taught in Statistics departments.

Note: Due to round-off, row and column sums may appear inaccurate.

number of sections of elementary statistics courses nearly doubled, and the number of sections of upper-level statistics courses increased by 39%. As noted in Chapter 1, changes to the mathematics and statistics department questionnaires may have led some enrollments that were listed as advanced-level statistics enrollments in 2005 to be classified as elementary-level statistics enrollments in 2010.

In the process of analyzing the CBMS2010 data that were collected, the survey directors learned that, particularly in lower-level courses, it is not clear what constitutes a course section or a recitation section. The 2010 questionnaire asked whether calculus and elementary statistics courses were taught in lecture with recitation or in individual classes; now there seem to be other options, and the 2015 survey directors will need to give some thought to the definition of a "section" of a course. The issue of "sections" is addressed further in Chapter 5, where the tables have broken down courses by the type of section structure.

Table E.4: Distance education in four-year colleges and universities

The 2010 CBMS survey defined distance-learning courses as "those courses in which the majority of the instruction occurs with the instructor and the students separated in time and/or space (e.g. courses in which the majority of the course is taught online, or by computer software, by television, or by correspondence)". Various practices in distance-learning courses were discussed in Chapter 2 (see Tables SP.10-SP.14). While at four-year departments these enrollments were still a small percentage of total enrollments, these enrollments appear to be growing. Distance-learning enrollments were a larger percentage of two-year college enrollments than of four-year college enrollments, and data on distance-learning enrollment at two-year colleges are included here for comparison (more information regarding distance-learning enrollments at two year-colleges is contained in Chapter 6).

Table E.4 shows that enrollments in certain distance-learning courses were up in 2010 over 2005 for every category in the table, except for Calculus I at two-year colleges, with the total distance-learning enrollments in Table E.4 for four-year mathematics and statistics departments (combined) in fall 2010 being nearly double those of fall 2005. In fall 2010, at two-year colleges, distance-learning enrollments represented 8% of precollege enrollments, 13% of college algebra, trigonometry and pre-calculus (combined) enrollments, 4% of Calculus I enrollments, and 21% of elementary statistics enrollments. At four-year mathematics departments, these percentages were 4%, 3%, 0.6%, and 6%, respectively, and in four-year statistics departments, 5% of the elementary statistics enrollment was taught in distance-learning sections. All of these percentages are increases over 2005, with the exception of Calculus I at two-year colleges. Distance-learning enrollments for individual courses (except for advanced-level courses) are contained in Appendix I; Chapter 2, Tables SP.13(A) and SP.13(B), present data on the advanced-level mathematics and statistics courses that were reported to be available in a distance-learning format in 2010.

Table E.4 shows that the largest distance-learning course category enrollment in mathematics departments at four-year institutions in fall 2010 occurred in elementary statistics, where the distance-learning enrollment was 12,368 (and the non-distance-learning enrollment was 218,385); the distance-learning enrollment in elementary statistics taught in mathematics departments in fall 2010 was more than four times that of fall 2005. The next largest category of distance enrollment in mathematics courses occurred in the category of college algebra, trigonometry, and pre-calculus, followed by the category of precollege-level mathematics. The distance-learning enrollment in elementary statistics courses offered in statistics departments was 4,172 in fall 2010, more than four times the distance-learning enrollment in fall 2005, as was the case for mathematics departments.

Tables E.5-E.12: Rank of instructors in mathematics and statistics courses at four-year mathematics and statistics departments in fall 2010

Past CBMS surveys have analyzed the rank of the instructors teaching mathematics and statistics courses at four-year departments. The 2000 survey generally tabulated percentages of *enrollments* taught by various rank instructors, while the 2005 survey switched to percentages of *sections* taught by instructors of various ranks. The 2010 survey continues the practice begun in 2005 of considering percentages of *sections*. In 2010, instructors were broken into the following categories: tenured, tenure eligible, or permanent faculty (TTE), other full-time (OFT) (a category that includes, for example, postdocs and academic visitors), part-time (PT), graduate teaching assistant (GTA), and unknown (Unk) (a category that was used when the response did not account for all sections of a course). The 2005 survey instrument did not include the phrase "permanent faculty" in the description of the TTE category but instructed departments at institutions that did not recognize tenure (estimated at 12% of all mathematics departments in the 2010 CBMS survey and 5% in the 2005 survey) to list permanent faculty in the TTE category. In the 2010 survey, the label "permanent" was added to the description of the TTE category on the questionnaire, and this change may have added to the TTE category other instructors who have teaching positions that

TABLE E.4 Enrollments in distance-learning courses (meaning courses in which the majority of the instruction occurs with the instructor and the students separated in time and/or space (e.g. courses in which the majority of the course is taught online, or by computer software, by television, or by correspondence)) and other sections for various freshman and sophomore courses, by type of department, in fall 2010. (Fall 2005 data in parentheses.)

	Four-year Mathematics Departments		Two-year Mathematics Departments		Statistics Departments	
	Distance-learning Enrollments	Other Enrollments	Distance-learning Enrollments	Other Enrollments	Distance-learning Enrollments	Other Enrollments
Precollege Level	8106 (2489)	201089 (198760)	87073 (37036)	1062667 (927697)		
College Algebra, Trigonometry, & Pre-Calculus	12021 (5856)	431420 (352591)	40898 (15721)	309272 (298081)		
Calculus I	2159 (593)	332632 (308518)	3504 (3620)	82192 (68919)		
Calculus II	782 (577)	128104 (94858)	285 (270)	30827 (20003)		
Differential Equations & Linear Algebra	862 (238)	115837 (82034)	298 (83)	10473 (7423)		
Elementary Statistics	12368 (3075)	218385 (140077)	23363 (9894)	110910 (107304)	4171 (990)	77153 (44303)

Note: For some distance-learning enrollments in this table, the Standard Error (SE) was very large. See the SE Appendix.

are regarded as permanent, although these faculty do not have tenure and are not eligible for tenure, even if their institution recognizes tenure. The instructions did not define "permanent" beyond the situation where the institution does not recognize tenure, but it seems quite possible that some departments interpreted "permanent faculty" to have this additional meaning, and some of the data suggest that this was the case. Hence, the addition of the word "permanent" may mean that in 2010, faculty who might be classified as "teaching faculty", who have renewable contracts, but are not tenured or tenure-eligible, may have been added to the TTE category, even if the institution recognizes tenure. As a consequence of this change, the other full-time category may consist primarily of postdocs and other temporary academic visitors.

Table E.5 summarizes the rank of the instructor in mathematics departments and statistics departments at four-year institutions in fall 2010. The percentage of sections taught by faculty at each rank, for each level of department, for instruction in mathematics courses, statistics courses, and computer science courses, is presented. The total number of sections is also given, and the numbers in parentheses are from the 2005 CBMS survey. Figure E.5.1 shows the percentages of mathematics course instructors of known rank for the different levels of mathematics departments, Figure E.5.2 gives these ranks for statistics courses in mathematics and statistics departments by level of department, and Figure E.5.3 gives these ranks for computer science courses.

Across all levels of four-year mathematics departments, the percentage of sections taught by tenured, tenure-eligible, or permanent faculty was slightly up in fall 2010 over fall 2005, with the one exception being computer science courses taught within mathematics departments, where the percentage of sections taught by part-time instructors almost doubled. In the 2010 survey, the percentage of sections of mathematics and statistics courses taught by an instructor of unknown rank generally increased, so it is difficult to reach definitive conclusions regarding decreases in the percentages of a given rank of course instructors. The increase in the number of sections with instructors of unknown rank may also be due to the increasing problem of defining what constitutes a section of a course, as "unknown" instructors resulted from discrepancies between numbers of reported sections and numbers of reported instructors for these sections.

The tables that follow Table E.5 give more detail on specific course categories; they present the *number* of sections (excluding distance-learning sections) of different course categories taught by the various ranks of faculty at the different levels of departments. Table E.6 gives the ranks for precollege-level mathematics courses, Table E.7 for introductory-level courses, Table E.8 for calculus-level (various types of calculus, linear algebra, differential equations, and discrete mathematics) sections, Table E.9 for elementary statistics sections, Table E.10 for lower-level computer science sections, and Table E.11 for middle-level computer science sections. For computer science courses, the phrase "permanent faculty" was not included in the TTE description that was on the questionnaire. Table E.12 presents the number of sections of advanced-level mathematics sections (including operations research) known to be taught by tenured/tenure eligible/permanent faculty, and similarly for statistics sections taught in mathematics departments and statistics departments.

From Table E.6, it appears that in fall 2010 there was increased use of tenured/tenure-eligible/permanent faculty for precollege-level mathematics courses, particularly at the masters and bachelors-level departments, perhaps reflecting the expanded definition of TTE faculty. Table E.8 shows a slight decrease in the percentage of calculus-level sections taught by tenured/tenure-eligible/permanent faculty, as the percentage dropped from 61% in 2005 to 59% in 2010 (but, in 2010, 8% of the instructors were of unknown rank, while in 2005, 5% were of unknown rank).

According to Table E.12, in advanced-level mathematics courses, the percentage of sections known to be taught by tenured, tenure-eligible, or permanent faculty decreased from 84% in 2005 to 79% in 2010 (however, at bachelors-level departments, this percentage increased from 84% in 2005 to 91% in 2010). For advanced-level statistics courses taught in mathematics departments, this percentage rose from 59% in 2005 to 77% in 2010. In statistics departments, the percentage of sections taught by tenured, tenure-eligible, or permanent faculty increased from 74% in 2005 to 79% in 2010.

TABLE E.5 Percentage of sections, excluding distance learning, of mathematics, statistics, and computer science courses taught by tenured/tenure-eligible or permanent faculty (TTE)[1], other full-time faculty (OFT), part-time faculty (PT), graduate teaching assistants (GTA), and other unknown (Unk) in mathematics departments and statistics departments by type of department in fall 2010, with fall 2005 figures in parentheses.

	Percentage of mathematics sections taught by						Percentage of statistics sections taught by						Percentage of CS sections taught by					
	TTE[1] %	OFT %	PT %	GTA %	Unk %	No. of Math sections	TTE[1] %	OFT %	PT %	GTA %	Unk %	No. of Stat sections	TTE %	OFT %	PT %	GTA %	Unk %	No. of CS sections
Math Depts																		
Univ (PhD)	33	24	14	17	13	19088	51	14	7	16	12	1530	42	30	15	11	2	201
	(35)	(24)	(14)	(21)	(6)	(17202)	(39)	(44)	(7)	(9)	(2)	(1498)	(39)	(38)	(9)	(7)	(6)	(214)
Univ (MA)	46	17	21`	6	11	16494	63	10	16	1	10	1628	89	0	11	0	0	307
	(45)	(20)	(22)	(8)	(6)	(12303)	(49)	(33)	(15)	(1)	(2)	(1639)	(43)	(8)	(18)	(0)	(30)	(715)
Coll (BA)	57	11	23	0	10	29712	62	8	15	0	14	5943	58	18	22	0	2	3740
	(54)	(20)	(23)	(1)	(3)	(24652)	(59)	(13)	(25)	(0)	(3)	(3962)	(80)	(9)	(9)	(0)	(1)	(2811)
Total Math Depts	47	16	20	6	11	65294	60	9	14	3	13	9102	60	17	21	1	2	4248
	(46)	(21)	(20)	(9)	(5)	(54157)	(52)	(24)	(19)	(2)	(2)	(7099)	(70)	(11)	(11)	(0)	(7)	(3762)
Stat Depts																		
Univ (PhD)							38	13	7	15	27	1573						
							(41)	(22)	(7)	(14)	(15)	(1195)						
Univ (MA)							65	9	10	2	14	1085						
							(64)	(27)	(7)	(0)	(2)	(342)						
Total Stat Depts							49	11	8	10	22	2658						
							(46)	(23)	(7)	(11)	(12)	(1537)						

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

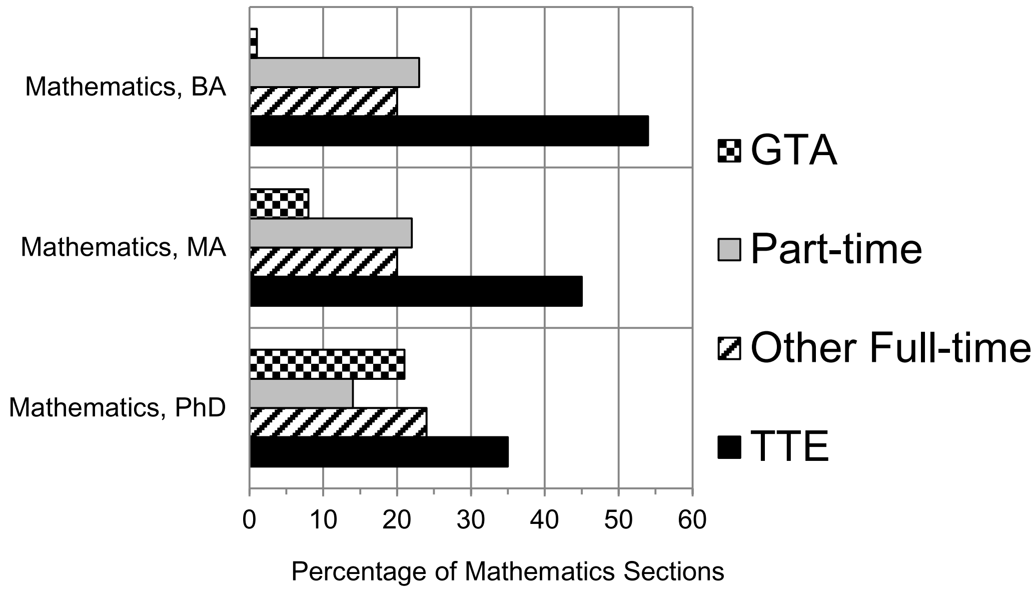

FIGURE E.5.1 Percentage of mathematics sections in mathematics departments whose instructors were tenure/tenure-eligible/permanent (TTE), other full-time faculty, part-time faculty, and graduate teaching assistants (GTA), by type of department in fall 2010. (Percentages may not sum to 100 due to "unknown" instructor percentages.)

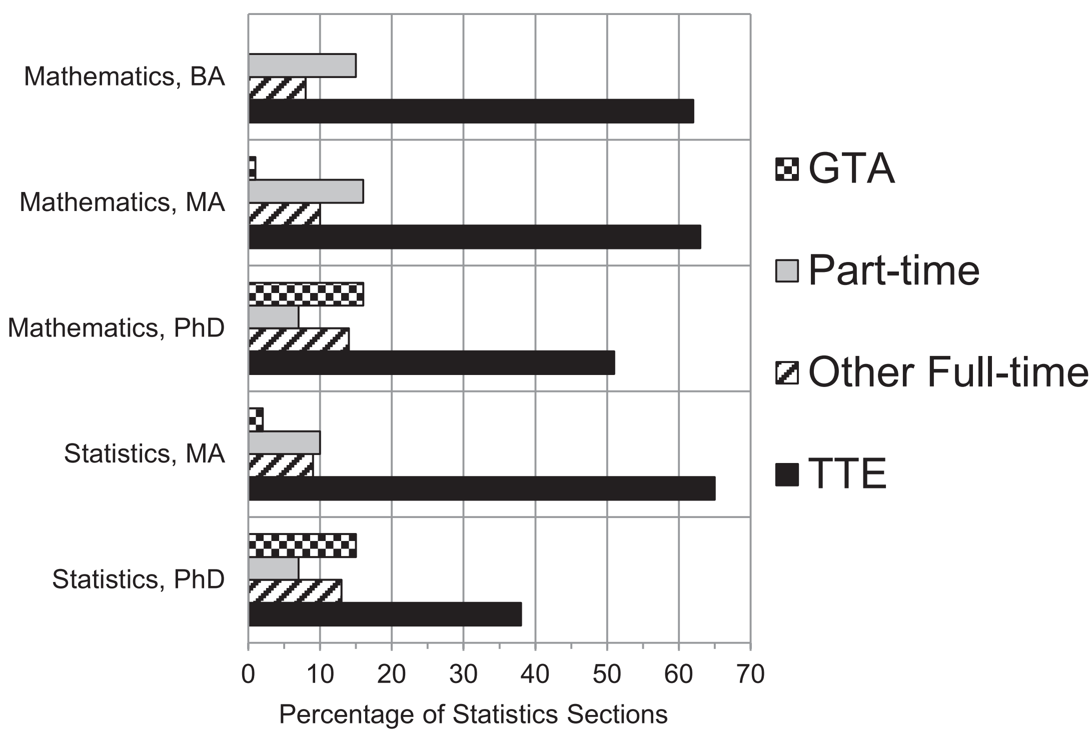

FIGURE E.5.2 Percentage of statistics sections in mathematics and in statistics departments whose instructors were tenure/tenure-eligible/permanent (TTE), other full-time faculty, part-time faculty, and graduate teaching assistants (GTA), by type of department in fall 2010. (Percentages may not sum to 100 due to “unknown” instructor percentages.)

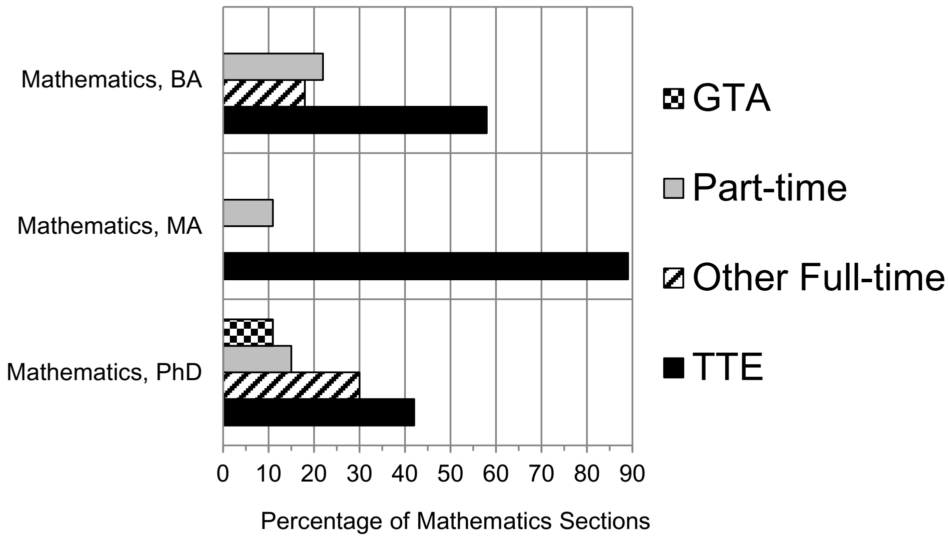

FIGURE E.5.3 Percentage of computer science sections in mathematics departments whose instructors were tenure/tenure-eligible/permanent faculty (TTE), other full-time faculty, part-time faculty, and graduate teaching assistants (GTA), by type of department in fall 2010. (Percentages may not sum to 100 due to "unknown" instructor percentages.)

TABLE E.6 Number of sections, not including distance learning, of precollege-level courses in mathematics departments taught by various types of instructor, by type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of precollege-level sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	31	353	666	365	162	1578
	(29)	(346)	(579)	(376)	(66)	(1363)
Univ (MA)	279	620	769	279	128	2075
	(55)	(534)	(616)	(641)	(99)	(1902)
Coll (BA)	1043	461	1806	27	362	3699
	(576)	(1189)	(2091)	(23)	(192)	(3862)
Total	1353	1434	3241	671	652	7352
	(660)	(2069)	(3286)	(1040)	(357)	(7126)

Note: Round-off may make row and column sums seem inaccurate.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

TABLE E.7 Number of sections (excluding distance learning) of introductory-level courses (including precalculus) in mathematics departments taught by various types of instructors, by type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of introductory-level sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	636 (588)	2128 (1798)	1123 (1176)	1616 (1902)	766 (394)	6268 (5517)
Univ (MA)	2073 (1849)	1611 (1570)	2058 (1657)	485 (295)	329 (369)	6556 (5543)
Coll (BA)	5529 (4079)	1891 (2808)	3761 (2998)	0 (0)	1344 (432)	12525 (9895)
Total	8238 (6517)	5631 (6175)	6942 (5831)	2100 (2196)	2438 (1196)	25349 (20955)

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

TABLE E.8 Number of sections (excluding distance learning) of calculus-level courses in mathematics departments taught by various types of instructor, by type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of calculus-level sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	3120 (3199)	2057 (3015)	789 (726)	1289 (1261)	721 (650)	7976 (7696)
Univ (MA)	3080 (2196)	495 (534)	611 (402)	160 (16)	213 (249)	4559 (3237)
Coll (BA)	6743 (5754)	839 (1426)	1223 (520)	0 (107)	771 (108)	9575 (7388)
Total	12943 (11149)	3391 (4976)	2622 (1648)	1448 (1384)	1705 (1006)	22110 (18321)

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

TABLE E.9 Number of sections (excluding distance learning) of elementary-level statistics taught in mathematics departments and statistics departments by types of instructor and type of department in fall 2010 with fall 2005 figures in parentheses.

	Number of elementary-level statistics sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	251	243	124	274	77	969
	(145)	(292)	(104)	(136)	(25)	(629)
Univ (MA)	641	185	293	19	70	1208
	(441)	(219)	(250)	(15)	(34)	(924)
Coll (BA)	2564	601	1130	28	691	5014
	(1738)	(456)	(987)	(0)	(100)	(3191)
Total	3456	1029	1547	320	838	7191
	(2324)	(967)	(1341)	(151)	(159)	(4744)
Statistics Departments						
Univ (PhD)	262	202	103	243	302	1113
	(144)	(171)	(88)	(172)	(180)	(696)
Univ (MA)	318	93	113	17	96	638
	(80)	(97)	(24)	(0)	(7)	(186)
Total	581	295	217	260	399	1751
	(224)	(268)	(112)	(172)	(187)	(882)

Note: Round-off may make row and column sums seem inaccurate.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

TABLE E.10 Number of sections (excluding distance learning) of lower-level computer science taught in mathematics departments, by type of instructor and type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of lower-level computer science sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	25	29	29	15	4	101
	(31)	(68)	(10)	(14)	(15)	(114)
Univ (MA)	116	0	30	0	0	146
	(187)	(50)	(127)	(0)	(149)	(512)
Coll (BA)	1089	397	656	14	73	2230
	(1199)	(223)	(256)	(0)	(6)	(1629)
Total	1229	426	715	30	77	2477
	(1416)	(341)	(393)	(14)	(169)	(2254)

Note: Round-off may make row and column sums seem inaccurate.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

TABLE E.11 Number of sections (excluding distance learning) of middle-level computer science taught in mathematics departments, by type of instructor and type of department in fall 2010, with fall 2005 figures in parentheses.

	Number of middle-level computer science sections taught by					
	Tenured/ tenure-eligible/ permanent [1]	Other full-time	Part-time	Graduate Teaching Assistant	Unknown	Total Sections
Mathematics Departments						
Univ (PhD)	31	11	2	7	0	51
	(19)	(55)	(3)	(3)	(0)	(61)
Univ (MA)	92	0	0	0	0	92
	(72)	(11)	(6)	(0)	(33)	(121)
Coll (BA)	521	156	95	0	0	769
	(613)	(168)	(6)	(0)	(22)	(739)
Total	644	168	97	7	0	912
	(703)	(234)	(15)	(3)	(55)	(921)

Note: Round-off may make row and column sums seem inaccurate.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

TABLE E.12 Number of sections of advanced mathematics (including operations research) and statistics courses in mathematics departments, and number of sections of advanced statistics courses in statistics departments, taught by tenured/tenure-eligible/permanent [1] (TTE) faculty, and total number of advanced level sections, by type of department in fall 2010 with fall 2005 data in parentheses.

Mathematics Departments	Sections taught by TTE [1]	Total sections	Statistics Departments	Sections taught by TTE [1]	Total sections
Advanced Mathematics courses					
Univ (PhD)	2500 (2184)	3266 (2625)			
Univ (MA)	2098 (1382)	3304 (1622)			
Coll (BA)	3548 (2941)	3913 (3507)			
Total advanced mathematics	8146 (6506)	10483 (7754)			
Advanced Statistics courses			Advanced Statistics courses		
Univ (PhD)	438 (434)	561 (869)	Univ (PhD)	324 (343)	452 (499)
Univ (MA)	308 (359)	420 (714)	Univ (MA)	382 (140)	442 (156)
Coll (BA)	721 (604)	929 (771)			
Total advanced statistics	1467 (1398)	1910 (2354)	Total advanced statistics	706 (483)	894 (654)
Total all advanced courses	9613 (7904)	12394 (10108)	Total all advanced courses	706 (483)	894 (654)

Note: Round-off may make row and column sums seem inaccurate.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

TABLE E.13 Average section size (excluding distance learning) for undergraduate mathematics, statistics, and computer science courses in mathematics and statistics departments, by level of course and type of department in fall 2010, with fall 2005 data, when available, in parentheses. Also, all departments' average section sizes from previous CBMS surveys.

	Average section size Fall 2010 (2005)							All Departments			
	Mathematics Depts				Statistics Depts						
	Univ (PhD)	Univ (MA)	Coll (BA)	Overall Math	Univ (PhD)	Univ (MA)	Overall Stat	1995	2000	2005	2010
Mathematics courses											
Precollege	36	30	23	27				31	29	28	27
	(40)	(31)	(22)	(28)							
Introductory (incl. Precalc)	47	31	27	33				34	35	33	33
	(48)	(34)	(25)	(33)							
Calculus	48	31	24	34				31	32	32	34
	(45)	(27)	(21)	(32)							
Advanced Mathematics	20	12	12	14				12	13	14	14
	(20)	(15)	(10)	(14)							
Statistics courses											
Elementary Statistics	52	32	26	30	49	38	45	38	37	35	33
	(47)	(34)	(26)	na	(60)	(63)	na				
Upper Statistics	27	13	12	17	33	27	30	19	22	19	21
	(17)	(13)	(13)	na	(40)	(22)	na				
CS courses											
Lower CS	29	22	20	21	na	na		22	22	19	21
	(25)	(22)	(18)	na	(16)	(66)					
Middle CS	18	15	12	12	na	na		14	22	9	12
	(19)	(8)	(8)	na	(48)	(16)					
Upper CS	15	16	11	11	na	na		12	11	8	11
	(15)	(8)	(7)	na	(0)	(0)					

Tables E.13 and E.14: Data on section size

Table E.13 summarizes data on the average section size for a selected list of course categories, broken down by the level of department, over the last four CBMS surveys. The Mathematical Association of America has recommended 30 students as the appropriate maximum class size for undergraduate mathematics courses [MAAGuidelines], and the CBMS surveys have shown that this maximum often is not maintained. In particular, section sizes at the doctoral-level departments often substantially exceed the MAA Guidelines. As we have noted, the definition of a section caused some problems with responses in 2010, particularly with calculus sections, a fact that will be discussed further in Chapter 5.

Table E.13 shows that there has not been much change from 2005 in the average section sizes in 2010; over the past four surveys, the overall section size of precollege-level mathematics, introductory mathematics, and elementary statistics has been slightly decreasing, while the overall section sizes of calculus and advanced-level mathematics have been slightly increasing. The average size of sections of calculus increased from 32 students in fall 2005 to 34 students in fall 2010, while the average size of sections of elementary statistics classes taught in mathematics and statistics departments combined decreased from 35 students in fall 2005 to 33 students in 2010. The size of computer science classes taught in mathematics departments increased from 2005 to 2010.

Table E.14 presents the size of recitation sections in calculus and elementary statistics courses. The size of recitation sections of calculus courses increased from fall 2005 to fall 2010, more than doubling in Mainstream Calculus II at bachelors-level departments. The average size of recitation sections in elementary statistics courses taught in mathematics and statistics departments decreased slightly, except at bachelors-level mathematics departments and masters-level statistics departments, where it increased significantly from fall 2005 to fall 2010.

TABLE E.14 Average recitation size in Mainstream Calculus I and II and other Calculus I courses and in elementary statistics courses that are taught using lecture/recitation method, by type of department in fall 2010, with fall 2005 data in parentheses. Distance-learning sections are not included. (A calculus course is "mainstream" if it leads to the usual upper-division mathematical sciences courses.)

	Average recitation section size		
For Lecture/Recitation Courses	Univ (PhD)	Univ (MA)	College (BA)
Calculus Courses			
Mainstream Calculus I	29 (28)	30 (19)	30 (21)
Mainstream Calculus II	29 (26)	25 (20)	33 (15)
Other Calculus I	30 (29)	19 (na)	15 (na)
Elementary Statistics			
in Mathematics Depts	28 (30)	29 (32)	32 (22)
in Statistics Depts	30 (32)	34 (19)	na (na)

Table E.15: AP credit for Calculus I in mathematics departments and Elementary Statistics in statistics departments

In 2010, for the first time, the CBMS survey produced an estimate of the average percentage of freshmen who received AP mathematics or statistics credit, broken down by level of department. The four-year mathematics questionnaire asked departments to give the total number of freshmen enrolled at the institution and the total number of these students who received AP credit for Calculus I. The statistics questionnaire asked the parallel question about AP credit for Elementary Statistics. The total of these numbers is given in the first two rows of Table E.15, broken down by level of department. Hence, for example, 10% of the total freshmen enrolled in doctoral-level institutions received credit for Calculus I. Moreover, the percentage of freshmen who received AP credit was calculated for each institution, and the mean values of these percentages are reported in the third row of Table E.15. Hence, across all mathematics departments, the average percentage of freshmen receiving AP credit for Calculus I was 5% (13% at doctoral-level mathematics departments) and 12% across all statistics departments. These baseline percentages may be compared to future years.

TABLE E.15 Number of freshmen (in 1000s) entering in Fall 2010 with AP credit for Calculus I in Mathematics Departments (Elementary Statistics in Statistics Departments) and the average of the ratio of number of freshmen with AP credit to the number of freshmen by type of department in fall 2010.

	Mathematics Departments				Statistics Departments		
Enrollments	Univ (PhD)	Univ (MA)	College (BA)	Total	Univ (PhD)	Univ (MA)	Total
Total freshmen enrolled in Fall 2010	346	209	336	891	65	57	122
Total entering with AP credit	34	8	13	55	11	2	13
Mean ratio of those with AP credit to total enrollment	0.13	0.03	0.04	0.05	0.18	0.04	0.12

Chapter 4

Faculty Demographics in Mathematical Sciences Departments of Four-Year Colleges and Universities

Introduction

In this chapter, we consider data on the number, gender, age, and race/ethnicity of mathematics faculty in doctoral-level, masters-level, and bachelors-level four-year mathematics departments, and also in doctoral-level and masters-level statistics departments possessing an undergraduate program in statistics. The same topics were presented in Chapter 1 tables for the profession as a whole. In this chapter, we will consider differences across departments grouped according to the highest degree offered and by gender. So that the discussion here can be relatively self-contained, we repeat some demographic data from Chapter 1.

- Table S.14 and Figure S.14.3 in Chapter 1 indicated that in fall 2010, the total number of full-time mathematics faculty plus part-time mathematics faculty for all levels of four-year mathematics departments combined remained about the same as in 2005, even though Table S.2 shows that enrollments in mathematics departments have risen by about 25%. The number of full-time mathematics faculty was up 2% from 2005 (a lower rate of increase than the 11% growth observed from 2000 to 2005), and the number of part-time mathematics faculty continued the pattern of small decline observed since 2000, down 7% from 2005. Table S.14 and Figure S.14.5 of Chapter 1 indicated that in fall 2010, the total number of full-time statistics faculty plus part-time statistics faculty in doctoral-level statistics departments increased 5% from 2005, even though Table S.2 shows that enrollments (excluding computer science enrollments) in statistics departments have risen by about 38%. The number of full-time statistics faculty increased 6%, and the number of part-time statistics faculty decreased 6% from 2005. Further details on numbers of full and part-time faculty are presented in Table F.1 in this chapter.
- Table S.16 in Chapter 1 indicated that when the number of full-time mathematics faculty is broken down further, the components of the small growth in the number of full-time mathematics faculty were a decline in the number of tenured and tenure-eligible faculty and an increase in the number of "other full-time faculty" (a category that includes postdoctoral appointments). The number of tenured mathematics faculty incurred a small decline (127 faculty), and there was a larger decline (765 faculty) in the number of tenure-eligible mathematics faculty, resulting in a 5% decrease in the sum of tenured plus tenure-eligible appointments in all levels of mathematics departments combined from 2005 to 2010.
- Table S.16 in Chapter 1 indicated that the number of other full-time appointments in all levels of mathematics departments combined increased by roughly 1,300 positions to 5,929 faculty (a 28% increase from 2005), including an increase of 206 postdoc positions (a 25% increase from 2005). In fall 2000, there were 3,533 other full-time mathematics faculty; hence, this category of mathematics faculty has risen 68% in 10 years. Table F.1 in this chapter provides more detail on the numbers of mathematics faculty broken down by level of department, highest degree of the faculty member, and by gender. It shows that the number of tenure-eligible faculty decreased from 2005 at both masters and bachelors-level departments, though the standard error in the bachelors-level number is large.
- Table S.16 in Chapter 1 indicated that in doctoral-level statistics departments from 2005 to 2010, the total number of tenured statistics faculty plus tenure-eligible statistics faculty grew by 6 faculty (less than 1% increase), the number of other full-time statistics faculty increased by 52 faculty (32% increase), and the number of postdoc statistics faculty increased by 20 faculty (39% increase). From 2005 to 2010, the number of tenured faculty decreased by 24 faculty (4% decrease), while the number of tenure-eligible faculty increased by 30 faculty (17% increase). In fall 2000, there were 99 other full-time faculty in doctoral-level statistics departments, and in fall 2010, there were 215 other full-time faculty; hence, over the past ten years, this category of statistics faculty has more than doubled. Table F.1 in this chapter provides more detail on numbers of statistics faculty, including data on masters-level statistics department faculty (which was not gathered in 2005).

- Table S.16 in Chapter 1 showed that in fall 2010, in all four-year mathematics departments combined, women comprised 29% of all full-time faculty, 21% of all tenured faculty, and 34% of all tenure-eligible faculty; each of these percentages is up several percentage points from 2005. In statistics, in fall 2010, women were 26% of all full-time faculty, 16% of tenured faculty, and 40% of tenure-eligible faculty, all up from 2005. Tables F.1, F.2, and F.3 in this chapter provide more detail on the numbers of women faculty.
- Tables S.17 and S.18 of Chapter 1 showed that the age distribution of mathematics and statistics faculty remained about the same from 2005 to 2010, the biggest change being an increase of three years in the average age of tenured women in doctoral-level statistics departments. The percentage of tenured and tenure-eligible mathematics faculty 65 and older increased from 8% in 2005 to 12% in 2010, consistent with the significant decline in the number of deaths and retirements observed in Table S.21 (which shows 360 deaths and retirements in 2009-2010, compared with 499 in 2004-2005 and 462 in 1999-2000). Table S.17 is broken down further in Table F.4 in this chapter. Tables S.19 and S.20 of Chapter 1 showed race/ethnicity in mathematics and statistics faculty had changed only slightly. In fall 2010, 79% of all full-time mathematics faculty were classified as "White, not Hispanic", almost the same percentage as in 2005; however, the percentage of female "White" faculty increased. In fall 2010, 64% of doctoral statistics faculty was classified as "White, not Hispanic", down from 71% in 2005. More information on race-ethnicity and gender is contained in Tables F.5 (full-time faculty) and F.6 (part-time faculty) in this chapter.

Data sources and notes on the tables

Each fall, the American Mathematical Society (AMS) conducts national surveys of mathematical sciences departments at four-year institutions, titled the *Annual Survey of the Mathematical Sciences*, or just the *Annual Survey* when the context is clear. This work is sponsored by the AMS, ASA, IMS, MAA, and SIAM with oversight provided via the Joint Data Committee (JDC) whose members are appointed by the sponsoring societies. Reports on these surveys [JDC] are published in the *Notices of the American Mathematical Society* each year and online at http://www.ams.org/profession/data/annual-survey/annual-survey. Beginning with the CBMS survey in 2005, demographic data for the CBMS survey is collected as part of the Annual Survey; the sampled departments were asked additional demographic questions that do not normally appear on the *Annual Survey*.

In comparing data from the CBMS surveys to data published in the *Annual Survey*, one must keep in mind several differences between the surveys. The tenured and tenure-eligible faculty (TTE) in the annual surveys do not include permanent faculty unless the institution does not recognize tenure. The *Annual Survey* does not include postdoctoral appointments as a part of "other full-time faculty" (OFT), while CBMS surveys do; i.e., CBMS surveys list "other full-time faculty" (which includes postdoctoral appointments) and also lists the portion of other full-time faculty that are postdoctoral appointments. The CBMS surveys of "statistics" include only statistics departments that offer an undergraduate program in statistics, while the *Annual Survey* studies all departments of statistics and biostatistics that award a Ph.D. However, the data for statistics departments that do not have an undergraduate program in statistics are not included in the tables that appear in this report. The 2005 *Annual Survey* did not include masters-level statistics departments, and the 2010 survey did include these departments; hence, comparisons to 2005 are for doctoral-level statistics programs, though the 2010 data for masters-level programs is presented in some tables. The *Annual Survey* uses stratified random samples of bachelors-level programs but a census of doctoral and masters-levels programs.

Table entries are rounded to the nearest integer, and the sum of rounded numbers is not always equal to the rounded sum.

Numbers of tenured and tenure-eligible faculty

From Table S.14 and Figure S.14.1 in Chapter 1, we see that the total number of full-time mathematics faculty in four-year colleges and universities across all types of departments increased about 2%, from 21,885 in fall 2005 to 22,293 in fall 2010. Despite the slight increase in full-time mathematics faculty, Table S.15 shows that the number of tenured plus tenure-eligible mathematics faculty decreased from 17,256 in 2005 to 16,364 in 2010.

Table F.1 gives numbers of faculty, broken down by level of department (highest degree the department offered), type of appointment, highest degree of the faculty, and gender. Table F.1.1, derived from F.1, gives totals across all of the types of mathematics and statistics departments. Table F.1 gives standard errors in some of the totals in Table F.1 in Appendix VII.

Table S.16 in Chapter 1 shows that across all types of mathematics departments combined, the number of tenured faculty decreased by 127 faculty (a 1% decrease), and the number of tenure-eligible faculty decreased by 765 (a 17% decrease), resulting in a 5% decrease in the total number of tenured plus tenure-eligible mathematics faculty. Table F.1 shows that in the doctoral-level mathematics departments, from 2005 to 2010, the number of tenured faculty decreased by 98 faculty (a 2% decrease), and the number of tenure-eligible faculty increased by 61 faculty (a 7% increase). In the masters-level departments, the number of tenured faculty decreased by 110 (a 4% decrease), and the number of tenure-eligible faculty decreased by 244 (a 24% decrease). In the bachelors-level departments, the number of tenured faculty increased by 81 faculty (a 1% decrease), and the number of tenure-eligible faculty decreased by 581 faculty (a 24% decrease). The 2005 CBMS report expressed the concern that the bachelors-level estimates might be overestimates because, for example, the doctoral tenured faculty estimate at bachelors-level departments had risen from 4,053 in 2000 to 4,697 to 2005; as the 2010 estimate is 5,218, there does appear to be growth in the number of tenured faculty at bachelors-level departments over the past ten years. From Table F.1 we see that the number of tenure-eligible faculty at bachelors-level departments has a standard error of 139, so it seems likely in 2010 that the growth in tenure-eligible faculty at bachelors-level departments has slowed, but possibly not by as much as our estimates indicate.

Table S.14 in Chapter 1 showed that the number of full-time statistics faculty in doctoral-level statistics departments increased by 58 faculty (a 6% increase). Table F.1 shows that from 2005 to 2010, the number of tenured faculty at doctoral-level statistics departments decreased by 24 faculty (a 4% decrease), and the number of tenure-eligible positions increased by 30 faculty (a 17% increase). Fall 2010 estimates for numbers of faculty at masters-level statistics departments are included in Table F.1; masters-level statistics departments were not surveyed in 2005, and the standard errors in the 2010 MA-level statistics department estimates are relatively large.

Increases in numbers of other full-time faculty

The category "other full-time faculty" is defined to be all faculty who are neither tenured nor tenure-eligible, and it includes postdoctoral positions. "Postdoctoral appointments" are defined as "temporary positions primarily intended to provide an opportunity to extend graduate training or to further research experience", and these positions occur primarily in doctoral-level departments. Generally, the numbers of both postdoctoral faculty and of other non-tenure-track faculty increased from 2005 to 2010 in both mathematics and statistics departments at all levels, except at masters-level mathematics departments. Table F.1.1 (or Table S.16 in Chapter 1) shows that across all levels of mathematics departments combined, the number of other full-time faculty increased from 4,629 in 2005 to 5,929 in 2010 (a 28% increase from 2005), including an increase of 206 postdoc positions (a 25% increase from 2005); in 2010, at all levels of mathematics departments combined, other full-time faculty comprised 27% of full-time mathematics faculty (up from 21% in 2005). It is also worth observing that in fall 2010 there were 1,025 postdoctoral appointments in mathematics, a number almost as large as the number of new doctorates in mathematics produced each year. At doctoral mathematics departments, when postdoc positions are removed, other full-time faculty increased by 209 faculty (a 16% increase); in doctoral-level mathematics departments in fall 2010, other full-time faculty (including postdoctoral appointments) are 31% of all full-time faculty. At bachelors-level departments, other full-time faculty increased by 895 faculty (a 58% increase), but the standard error in this estimate is large (377), making this increase possibly not as large as our estimate; in bachelors-level departments in fall 2010, other full-time faculty are 25% of all full-time faculty. At masters-level mathematics departments, the number of other full-time faculty decreased by 41 faculty (a 4% decrease), but the standard error in this total is 32; in masters-level departments in fall 2010, other full-time faculty are 24% of all full-time faculty. At doctoral-level mathematics departments, other full-time faculty without a doctorate increased by 88 faculty (a 13% increase), and 30% of other full-time faculty are non-doctoral faculty in 2010. At bachelors-level departments, we estimate that 74% of other full-time faculty are non-doctoral faculty. As CBMS2005 noted increases in the numbers of other full-time faculty in every category, the number of other full-time faculty should continue to be closely monitored.

The increased number of other full-time faculty is a concern in statistics departments, as well, because the number of other full-time statistics faculty has more than doubled over the past ten years. In doctoral-level statistics departments, the number of postdocs increased from 51 to 71 (a 39% increase), and the number of other full-time faculty, excluding postdocs, increased from 112 in 2005 to 144 in 2010 (a 29% increase from 2005 to 2010). It is interesting to note that in the doctoral mathematics departments in 2010, there were more postdoctoral faculty than tenure-eligible faculty, while in doctoral statistics departments, the number of postdoctoral faculty was about one-third of the number of tenure eligible faculty. In 2010, 86% of other full-time statistics faculty possessed a doctoral degree.

Decreases in numbers of part-time faculty

Table S.14 in Chapter 1 showed that the number of part-time faculty in all mathematics departments combined in 2010 was estimated at 6,050, a decrease of 7% from 2005 to 2010; the 2010 estimate of the number of part-time mathematics faculty represents a 17% decline from 2000 but is still above the 1995 estimate of 5,399 part-time mathematics faculty. Table F.1 shows that the number of part-time faculty decreased at masters and at bachelors-level mathematics departments but increased 5% at doctoral mathematics departments (up 55 faculty from 2005). The biggest decline in numbers of part-time faculty was in bachelors-level departments, where the number of part-time faculty decreased by 469 faculty (a 13% decrease); however, the standard error in the number of part-time faculty at bachelors-level departments is 292, making our estimate rather uncertain. In 2010, 22% of part-time mathematics faculty had a doctoral degree, while in 2005, this percentage was 25%.

Table S.14 showed that the number of part-time faculty at doctoral-level statistics departments decreased from 112 in 2005 to 105 in 2010. In 2010, 80% of doctoral-level part-time statistics faculty held a doctoral degree (compared to 34% in doctoral-level mathematics departments).

Non-doctoral faculty

Table F.1 shows that in fall 2010, at doctoral-level mathematics departments, 10% of full-time faculty were non-doctoral faculty. At doctoral-level mathematics departments, the numbers of both non-doctoral full-time faculty and non-doctoral part-time faculty increased from 2005 to 2010. Almost all of the non-doctoral full-time faculty at Ph.D.-level mathematics departments in 2010 were other full-time faculty, and that number increased by 88 faculty (a 13% increase) from 2005; non-doctoral part-time faculty at doctoral-level mathematics departments increased by 97 faculty (a 15% increase). In fall 2010, at masters-level mathematics departments, 20% of full-time faculty were non-doctoral faculty. The number of non-doctoral mathematics faculty at masters-level departments decreased from 2005 to 2010 in all categories, the most significant decrease being a decrease of 67 tenured non-doctoral faculty (a 51% decrease). In fall 2010, at bachelors-level mathematics departments, 24% of full-time faculty were non-doctoral faculty. At bachelors-level mathematics departments, the number of non-doctoral faculty decreased from 2005 to 2010 in all categories, except in other full-time faculty. The number of tenured non-doctoral faculty at bachelors-level departments decreased by 440 faculty (a 48% decrease); the number of other full-time non-doctoral faculty increased by 784 faculty, but the standard error in bachelors-level other full-time faculty was large (377). The number of full-time non-doctoral faculty in doctoral-level statistics departments is small (about 3% of full-time faculty), and non-doctoral part-time faculty comprised 20% of part-time statistics faculty in doctoral statistics departments (compared with 66% of part-time faculty in doctoral-level mathematics departments).

Gender

According to the *Annual Survey* reports, the percentage of women receiving Ph.D. degrees in the mathematical sciences has remained close to 30% each year over the last ten years. Table S.16 in Chapter 1 shows that of the new Ph.D.s that were awarded from July 1, 2005-June 30, 2010, 32% were awarded to women. The 2010 CBMS survey shows that although the number of new women Ph.D.s remained relatively constant, women continued to make gains in numbers of faculty in most categories. Table S.16 showed that the combined total number of female full-time mathematics faculty in four-year mathematics departments increased by about 14%, from 5,641 in 2005 to 6,416 in 2010. Table S.16 further showed that in fall 2010, women comprised 29% of full-time mathematics faculty (up from 26% in 2005), 21% of tenured mathematics faculty (up from 18% in 2005), 34% of tenure-eligible faculty (up from 29%), and 41% of other full-time faculty (down from 44% in 2005); the percentage of postdocs who were women remained the same at 23%. Figure S.16.1 in Chapter 1 displays the percentages of tenured women and of tenure-eligible women in the combined four-year mathematics departments and in the doctoral statistics departments in 2005 and 2010.

Tables F.1, F.2, F.3, and Figure F.3.1 provide data on the numbers of women in different levels of departments. Across all types of mathematics departments combined, Table F.2 shows that the number of women in tenured positions rose by 408 faculty (a 17% increase over 2005), while there was a decrease in the total number of tenured faculty, and the number of women in tenure-eligible positions decreased slightly (the total number of tenure-eligible faculty also decreased). At doctoral-level departments, the number of tenured women rose by 98 faculty (a 23% increase), and the number of tenure-eligible women rose by 50 (a 23% increase). The number of female postdocs increased by 78 faculty (an increase of 53%). In 2010, women comprised 27% of the tenure-eligible positions in doctoral-level mathematics departments (the percentage was 24% in 2005). At masters-level and bachelors-level departments, the number of tenured women increased over 2005, and the number of tenure-eligible women decreased (the total number of tenure-eligible positions decreased, also); at masters-level departments, the number of tenured women faculty was up by 14%, and the number of tenure-eligible women faculty was down by 16%, while at bachelors-level departments, the number of tenured women faculty was up by 17%, and the number of tenure-eligible women faculty was down by 3%. In fall 2010, women comprised 37% of tenure-eligible positions in masters-level departments and 36% of tenure-eligible positions in bachelors-level

TABLE F.1 Number of faculty, and of female faculty (F), in various types of mathematics departments and PhD and MA statistics departments, by highest degree and type of department, in fall 2010. (Fall 2005 figures are in parentheses, and postdocs are included in other full-time (OFT) faculty totals.)

	Univ (PhD)					Univ (MA)					Coll (BA)				
	Tenured	Tenure-eligible	OFT	Post-docs	Part-time	Tenured	Tenure-eligible	OFT	Post-docs	Part-time	Tenured	Tenure-eligible	OFT	Post-docs	Part-time
Mathematics Depts															
Doctoral Faculty	4604	986	1739	1001	370	2369	758	237	16	354	5218	1712	627	6	609
	(4,699)	(930)	(1,381)	(760)	(412)	(2,412)	(990)	(268)	(5)	(383)	(4,697)	(2,179)	(516)	(48)	(837)
Doctoral (F)	518	269	496	226	107	579	273	89	6	102	1408	546	158	0	220
	(420)	(218)	(336)	(147)	(95)	(480)	(319)	(97)	(2)	(102)	(1,080)	(614)	(166)	(41)	(210)
Non-doctoral Faculty	16	8	756	0	731	65	17	749	1	1434	475	136	1821	0	2553
	(20)	(3)	(668)	(4)	(634)	(132)	(29)	(760)	(2)	(1,477)	(915)	(251)	(1,037)	(0)	(2,793)
Non-doctoral (F)	6	1	449	0	326	26	11	427	1	659	203	127	828	0	1263
	(7)	(2)	(399)	(1)	(291)	(52)	(18)	(435)	(0)	(588)	(293)	(79)	(626)	(0)	(1,294)
Total Mathematics	4621	994	2495	1001	1101	2434	775	986	18	1787	5693	1848	2448	6	3161
	(4,719)	(933)	(2,049)	(764)	(1,046)	(2,544)	(1,019)	(1,027)	(7)	(1,860)	(5,612)	(2,429)	(1,553)	(48)	(3,630)
Total Mathematics (F)	525	270	946	226	433	605	284	516	7	761	1611	673	987	0	1484
	(427)	(220)	(735)	(148)	(386)	(532)	(337)	(532)	(2)	(689)	(1,373)	(693)	(792)	(41)	(1,503)
Statistics Depts	Univ (PhD)					Univ (MA)									
Doctoral Faculty	579	207	184	71	84	145	57	20	15	9					
	(603)	(178)	(133)	(51)	(76)	(na)	(na)	(na)	(na)	(na)					
Doctoral (F)	95	84	61	18	15	20	18	7	7	0					
	(79)	(66)	(46)	(16)	(16)	(na)	(na)	(na)	(na)	(na)					
Non-doctoral Faculty	1	2	31	0	21	2	0	37	0	20					
	(1)	(1)	(30)	(0)	(36)	(na)	(na)	(na)	(na)	(na)					
Non-doctoral (F)	0	0	20	0	11	2	0	20	0	7					
	(0)	(0)	(20)	(0)	(17)	(na)	(na)	(na)	(na)	(na)					
Total Statistics	580	209	215	71	105	147	57	57	15	29					
	(604)	(179)	(163)	(51)	(112)	(na)	(na)	(na)	(na)	(na)					
Total Statistics (F)	95	84	82	18	26	22	18	26	7	7					
	(79)	(66)	(66)	(16)	(33)	(na)	(na)	(na)	(na)	(na)					

TABLE F.1.1 Number of faculty, and of female faculty (F), in mathematics departments combined and of statistics departments combined in fall 2010. (Fall 2005 figures are in parentheses for Mathematics Departments combined but are not available for Masters Statistics Departments.)

	Tenured	Tenure-eligible	OFT	Post-docs	Part-time
Mathematics Depts	Univ (PhD) + Univ (MA) + Coll (BA)				
Doctoral Faculty	12191 (11,808)	3456 (4,099)	2603 (2,165)	1024 (813)	1332 (1,632)
Doctoral (F)	2505 (1,980)	1088 (1,151)	744 (599)	232 (190)	429 (407)
Non-doctoral Faculty	557 (1,067)	161 (283)	3326 (2,465)	1 (6)	4718 (4,904)
Non-doctoral (F)	235 (352)	139 (99)	1705 (1,460)	1 (1)	2249 (2,173)
Total Mathematics	12747 (12,875)	3617 (4,381)	5929 (4,629)	1025 (819)	6050 (6,536)
Total Mathematics (F)	2740 (2,332)	1227 (1,250)	2449 (2,059)	233 (191)	2678 (2,578)
Statistics Depts	Univ (PhD) + Univ (MA)				
Doctoral Faculty	724 (na)	264 (na)	204 (na)	86 (na)	93 (na)
Doctoral (F)	115 (na)	102 (na)	68 (na)	24 (na)	15 (na)
Non-doctoral Faculty	3 (na)	2 (na)	69 (na)	0 (na)	41 (na)
Non-doctoral (F)	2 (na)	0 (na)	40 (na)	0 (na)	18 (na)
Total Statistics	727 (na)	267 (na)	272 (na)	86 (na)	133 (na)
Total Statistics (F)	117 (na)	102 (na)	108 (na)	24 (na)	32 (na)

departments (these percentages were 33% and 29%, respectively, in 2005).

Table F.1 shows that in fall 2010, women comprised 44% of the part-time mathematics positions across all types of four-year mathematics departments combined (this percentage is up from 39% in 2005). The percentage of part-time positions occupied by women was highest in bachelors-level departments, where it was 47%.

Continuing a trend evident in the 2005 CBMS survey, women continue to make even more impressive gains in numbers of faculty in statistics departments. Table F.1.1 shows that for doctoral-level and masters-level statistics departments combined, in fall 2010, women comprised 16% of tenured faculty, 38% of tenure-eligible faculty, 40% of other full-time faculty, and 28% of postdocs; in addition, 24% of part-time faculty are women. Table F.1 shows that from 2005 to 2010, the number of women in every category of doctoral statistics departments increased, except in part-time faculty. In fall 2010, the number of full-time women faculty in doctoral statistics departments was 261, up 50 from 2005 (a 24% increase); the number of tenured women faculty increased 20%, the number of tenure-eligible women increased 27%, and the number of women postdocs increased 13%.

It is interesting to compare doctoral statistics departments to doctoral mathematics departments. In fall 2010, women were 11% of tenured faculty in doctoral mathematics departments and 16% of

TABLE F.2 Number of tenured, tenure-eligible, postdoctoral, and other full-time faculty in mathematics departments at four-year colleges and universities by gender and type of department in fall 2010. (Note: Postdoctoral faculty are included in other full-time totals.)

	Univ (PhD)				Univ (MA)				Coll (BA)				**Total**			
	Tenured	Tenure-eligible	Other full-time	Post-docs[1]	Tenured	Tenure-eligible	Other full-time	Post-docs[1]	Tenured	Tenure-eligible	Other full-time	Post-docs[1]	Tenured	Tenure-eligible	Other full-time	Post-docs[1]
Men, 2010	4096	724	1549	775	1829	490	470	10	4082	1175	1461	6	10007	2390	3480	792
Women, 2010	525	270	946	226	605	284	516	7	1611	673	987	0	2740	1227	2449	233
Total, 2010	4621	994	2495	1001	2434	775	986	18	5693	1848	2448	6	12747	3617	5929	1025
Men, 2005	4292	713	1314	616	2011	682	495	4	4239	1737	761	8	10542	3132	2570	628
Women, 2005	427	220	735	148	532	337	532	2	1373	693	792	41	2332	1250	2059	191
Total, 2005	4719	933	2049	764	2544	1019	1027	7	5612	2429	1553	48	12874	4382	4629	819

[1] A postdoctoral appointment is a temporary position primarily intended to provide an opportunity to extend graduate training or to further research experience. Postdoctoral faculty are included in the other full-time-faculty totals throughout CBMS2010. This contrasts with publications of the AMS-ASA-IMS-MAA-SIAM Annual Survey since 2003, which list postdoctoral faculty as a category separate from other full-time-faculty. Before 2003, separate counts of postdoctoral faculty were not collected by the Annual Survey.

Note: Round-off may make marginal totals seem inaccurate.

TABLE F.3 Number of tenured, tenure-eligible, other full-time, and postdoctoral faculty in statistics departments, by gender, in fall 2010 and 2005. (Postdoctoral faculty are included in other full-time faculty totals. Data for Masters Statistics Departments was not collected in 2005.)

	Doctoral Statistics Departments				Masters Statistics Departments				**Total**			
	Tenured	Tenure-eligible	Other full-time	Postdocs[1]	Tenured	Tenure-eligible	Other full-time	Postdocs[1]	Tenured	Tenure-eligible	Other full-time	Postdocs[1]
Men, 2010	485	125	133	53	125	40	31	9	610	165	164	62
Women, 2010	95	84	82	18	22	18	26	7	117	102	108	24
Total, 2010	580	209	215	71	147	57	57	15	727	267	272	86
Men, 2005	525	113	97	35	na	na	na	na	na	na	na	na
Women, 2005	79	66	66	16	na	na	na	na	na	na	na	na
Total, 2005	604	179	163	51	na	na	na	na	na	na	na	na

[1] A postdoctoral appointment is a temporary position primarily intended to provide an opportunity to extend graduate training or to further research experience. Postdoctoral faculty are included in the other full-time-faculty totals throughout CBMS2010. This contrasts with publications of the AMS-ASA-IMS-MAA-SIAM Annual Survey since 2003, which list postdoctoral faculty as a category separate from other full-time-faculty. Before 2003, separate counts of postdoctoral faculty were not collected by the Annual Survey.

tenured faculty in doctoral statistics departments, 27% of tenure-eligible mathematics faculty and 40% of tenure-eligible statistics faculty, 23% of mathematics postdoc faculty and 25% of statistics postdoc faculty. Given the high percentage of women in tenure-eligible statistics faculty positions, it is likely that women will make further gains in numbers of tenured faculty in doctoral statistics departments over the coming years. The percentage of women in tenure-eligible doctoral statistics faculty positions is higher than the percentage of women in tenure-eligible mathematics faculty positions in all of the three levels of mathematics departments.

Age distribution

Table S.17 and Figure S.17.1 in Chapter 1 presented the age distribution of tenured and tenure-eligible men and women in all four-year mathematics departments in fall 2010, and Table F.4 and Figures F.4.1, F.4.2, and F.4.3 display the finer breakdown of faculty ages by level of mathematics or statistics department. The tables also show average ages within each type of department, and the percentages within each type of department total 100%, except for possible round-off.

Table F.4 can be used to compare the average ages of mathematics faculty in 2005 and 2010 for various categories of full-time faculty and different levels of departments. The average age of tenured men is higher than that of tenured women in each of the three levels of mathematics departments. The average age of tenured men rose from 2005 to 2010 for each level of mathematics department, and the average age of tenured women rose for each level, except masters-level departments. Over the past decade, from 2000 to 2010, the average age of tenured men at doctoral-level mathematics departments increased from 52.1 in 2000 to 55.4 in 2010.

Table F.4 can also be used to compare the percentage of the tenured and tenure-eligible faculty age 65 and above in the fall of 2000, 2005, and 2010, for each level of department. For example, at the bachelors-level mathematics departments, this percentage increased from 3% to 5% to 10% over the three surveys. Comparing Table S.17 in Chapter 1 with its counterpart in 2000 and 2005, for all departments combined, this percentage grew from 5% to 8% to 12% between 2000 and 2010.

Table F.4 shows that the average age of tenured male faculty in all statistics departments combined increased slightly, and the average age of tenured female faculty showed a greater increase (from 45.6 in 2005 to 48.4 in 2010); the average age of tenured

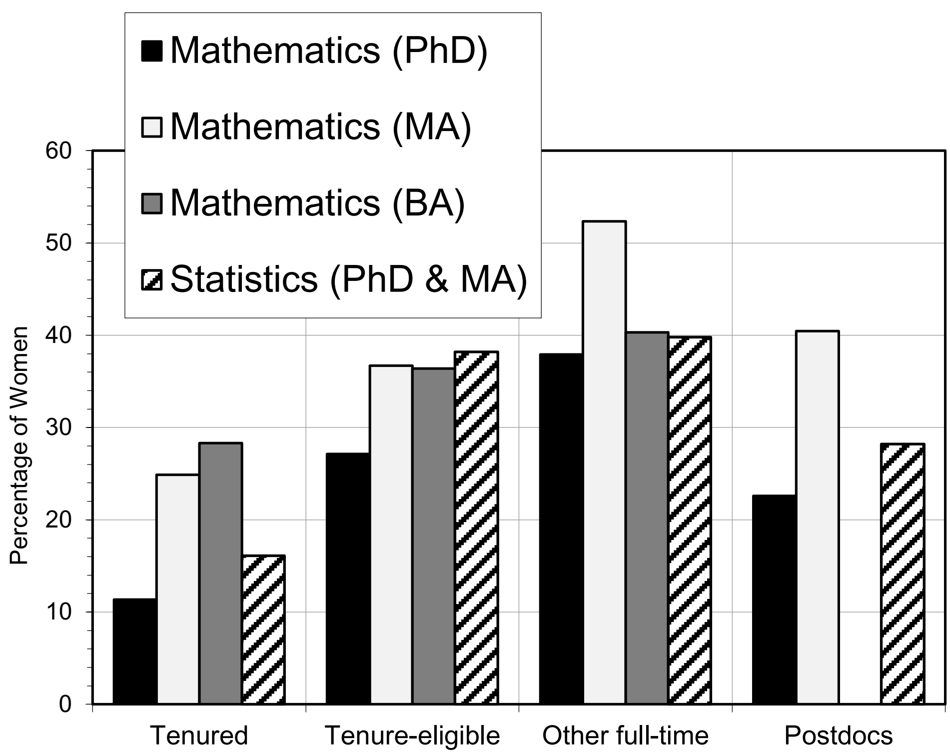

FIGURE F.3.1 Percentage of women in various faculty categories, by type of department, in fall 2010.

TABLE F.4 Percentage of tenured and tenure-eligible mathematics department and statistics department faculty at four-year colleges and universities belonging to various age groups by type of department and gender in fall 2010.

	<30 %	30-34 %	35-39 %	40-44 %	45-49 %	50-54 %	55-59 %	60-64 %	65-69 %	>69 %	Average age 2005	Average age 2010
Mathematics Depts.												
Univ (PhD)												
Tenured Men	0	1	5	7	10	11	13	11	9	7	54.4	55.4
Tenured Women	0	0	1	2	2	1	1	1	0	0	50.0	50.5
Tenure-eligible men	1	5	4	2	0	0	0	0	0	0	36.3	36.3
Tenure-eligible women	0	2	2	1	0	0	0	0	0	0	37.3	36.8
Total Univ (PhD)	1	8	12	12	12	13	14	12	9	7		
Univ (MA)												
Tenured Men	0	1	4	8	9	10	10	8	6	3	53.8	54.1
Tenured Women	0	0	2	3	4	3	3	1	1	1	52.1	50.7
Tenure-eligible men	1	5	4	2	1	0	0	0	0	0	38.3	37.3
Tenure-eligible women	1	3	2	1	1	0	0	0	0	0	38.7	39.1
Total Univ (MA)	2	9	12	14	14	14	14	10	7	4		
Coll (BA)												
Tenured Men	0	1	4	6	9	8	8	10	7	2	52.9	54.0
Tenured Women	0	0	3	3	4	3	3	3	1	0	49.6	50.9
Tenure-eligible men	2	5	3	2	2	0	0	0	0	0	40.2	37.2
Tenure-eligible women	1	4	2	1	1	1	0	0	0	0	38.9	37.4
Total Coll (BA)	4	10	11	12	16	13	11	13	8	2		
Statistics Depts.												
Univ (MA)												
Tenured Men	0	1	8	9	12	3	12	10	5	2	na	52.5
Tenured Women	0	0	3	2	1	0	3	1	1	0	na	49.8
Tenure-eligible men	2	10	4	0	0	1	0	0	0	0	na	34.4
Tenure-eligible women	2	4	2	0	0	0	0	0	0	0	na	32.5
Total Univ (MA)	4	15	17	11	13	4	15	11	7	2		
Univ (PhD)												
Tenured Men	0	1	5	9	7	8	10	12	5	4	52.7	54.2
Tenured Women	0	1	2	2	2	2	1	1	1	0	45.6	48.1
Tenure-eligible men	2	7	5	1	0	0	0	0	0	0	33.7	34.9
Tenure-eligible women	1	4	4	1	0	0	0	0	0	0	33.2	36.2
Total Univ (PhD)	2	14	16	14	9	10	12	13	6	5		

Note: 0 means less than half of 1%.

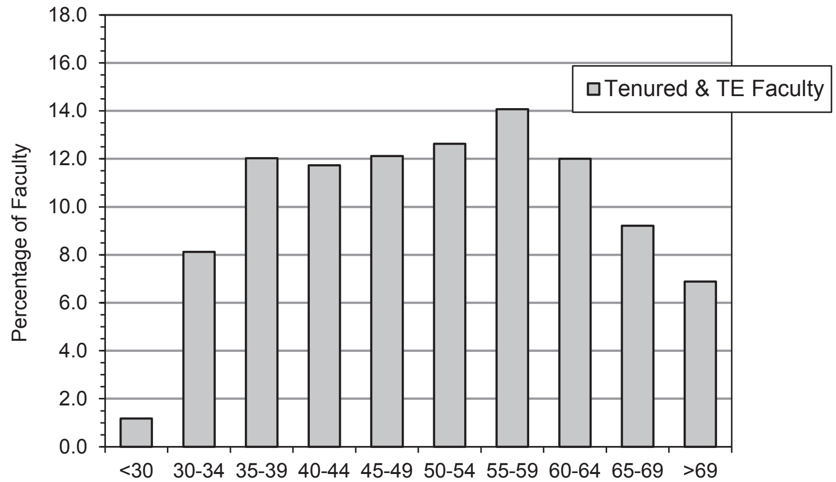

FIGURE F.4.1 Percentage of tenured and tenure-eligible faculty in doctoral mathematics departments in various age groups in fall 2010.

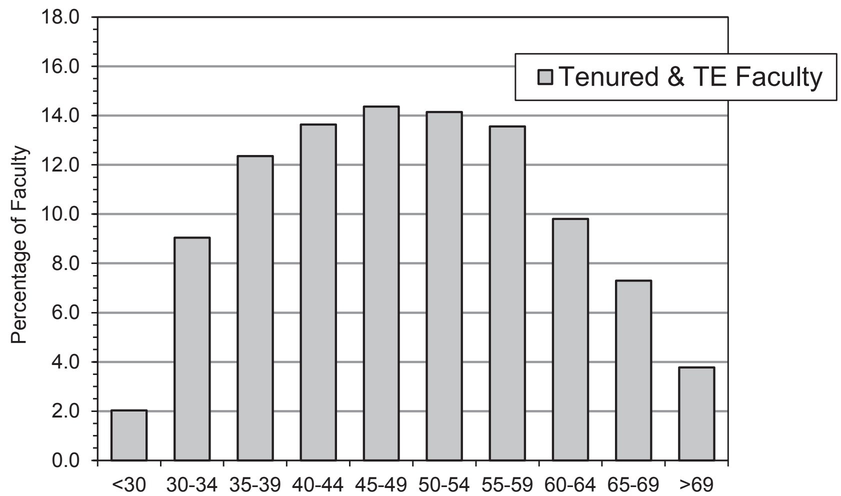

FIGURE F.4.2 Percentage of tenured and tenure-eligible faculty in masters-level mathematics departments belonging to various age groups in fall 2010.

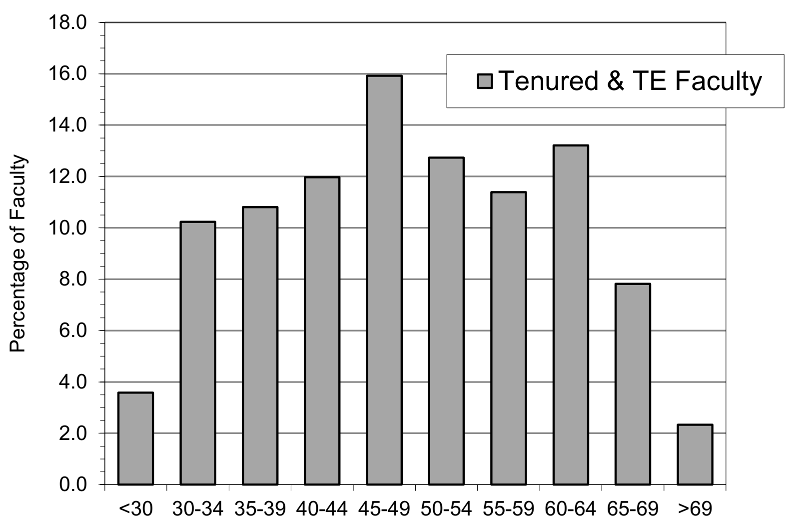

FIGURE F.4.3 Percentage of tenured and tenure-eligible faculty in bachelors-level mathematics departments belonging to various age groups in fall 2010.

female statistics faculty is still lower than that of tenured female doctoral-level mathematics faculty (50.7). Indeed, as Figures S.17.1 and S.18.1 showed, the distribution of tenured and tenure-eligible women is more skewed toward younger women in doctoral statistics departments than in all four-year mathematics departments combined.

Race, ethnicity, and gender

Table S.19 in Chapter 1 gave the percentages of faculty in fall 2010 by gender, and in various racial/ethnic groups, for tenured, tenure-eligible, postdoctoral, and other full-time faculty in all types of mathematics departments combined.

The *Annual Survey* follows the federal pattern for racial and ethnic classification of faculty. However, in the text of this report, some of the more cumbersome federal classifications will be shortened. For example "Mexican-American/Puerto Rican/other Hispanic" will be abbreviated to "Hispanic". Similarly, the federal classifications "Black, not Hispanic" and "White, not Hispanic" will be shortened to "Black" and "White", respectively, and "Native American/Alaskan Native/Native Hawaiian/Pacific Islander" will be shortened to "Other/Unknown".

Comparing Table S.19 in CBMS2010 to the corresponding Table S.20 in CBMS2005, the percentages of various racial/ethnic and gender groups look quite similar, with the most noticeable difference being a decrease from 2005 to 2010 in the percentage of White male faculty and an increase in White female faculty. The percentage of racial/ethnic minorities remains small. Table F.5 breaks these numbers down by type of department. Comparing Table F.5 in CBMS2010 to Table F.5 in CBMS2005 shows that in doctoral mathematics departments, Asian faculty of both genders have slightly increased, and White male faculty decreased from 66% in 2005 to 59% in 2010 (White females increased from 14% to 16%). In masters-level mathematics departments, Asian male and female faculty increased by two percentage points and one percentage point, respectively, Black male and female faculty both were up one percentage point, and White male faculty decreased from 54% in 2005 to 47% in 2010 (while White female faculty increased from 22% to 26%). In bachelors-level mathematics departments, Asian male and female faculty decreased by two percentage points and one percentage point, respectively, while White women faculty increased by three percentage points.

Table F.5 shows these percentages for all statistics faculty combined. Comparing Table F.5 in CBMS2010 to Table F.5 in CBMS2005, the percentage of White male faculty decreased from 2005 to 2010 by six percentage points, White women decreased by one percentage point, Asian men and women faculty have increased (two percentage points and one percentage point, respectively), Black women decreased by one percentage point, and Hispanic women increased by one percentage point.

Table F.6 gives the 2010 percentages of part-time faculty in various racial/ethnic groups, broken down by gender, in each type of mathematics department and in all statistics departments combined. Comparing Table F.6 in the CBMS2005 and CBMS2010 reports for the doctoral-level mathematics departments, we see that the percentage of Asian male, Asian female, Black female, Hispanic male, and Hispanic female part-time faculty all increased one percentage point; White male part-time faculty decreased from 50% in 2005 to 46% in 2010, and White women part-time faculty decreased from 31% in 2005 to 30% in 2010. In masters-level mathematics departments, Asian and Hispanic women part-time faculty gained one percentage point and Black male part-time faculty gained two percentage points, while White male part-time faculty declined from 46% to 38% and White female part-time faculty decreased from 33% to 27%. At the bachelors-level mathematics departments, Asian men, Black women, Hispanic women, and White men all dropped one percentage point, while Black men and Hispanic men dropped two percentage points, and White women increased from 31% to 38%. It is also of interest to compare the racial-ethnic distribution of full-time faculty against that of part-time faculty at the same level of department. In each level of mathematics department, White men are a smaller percentage of part-time faculty than of full-time faculty, while the percentage of White women is always greater for part-time faculty over full-time faculty; the percentage of Asian men is also smaller for part-time faculty across each level of mathematics department.

In statistics departments, Asian male part-time faculty dropped from 11% to 3%, Black male part-time faculty increased by two percentage points, Hispanic male part-time faculty decreased by one percentage point, White male part-time faculty increased from 44% to 64%, and White female part-time faculty decreased from 23% to 19%. The percentage of both White women and White men is greater among part-time statistics faculty than among full-time, while the percentage of Asian male and female faculty is greater among full-time faculty than part-time faculty.

For a small percentage of the faculty, race and ethnicity data were listed as "unknown" by the responding departments, and these faculty are listed as "unknown" in Tables F.5 and F.6.

TABLE F.5 Percentages of full-time faculty belonging to various ethnic groups, by gender and type of department, in fall 2010. Except for round-off, the percentages within each departmental type sum to 100%.

	Percentage of Full-time Faculty				
	Asian %	Black, not Hispanic %	Mexican American/ Puerto Rican/ other Hispanic %	White, not Hispanic %	Other/ Unknown[1] %
PhD Mathematics Departments					
All full-time men	13	1	2	59	3
All full-time women	4	0	1	16	1
MA Mathematics Departments					
All full-time men	12	4	2	47	2
All full-time women	5	2	1	26	1
BA Mathematics Departments					
All full-time men	4	2	2	57	2
All full-time women	2	1	1	28	1
All Statistics Departments					
All full-time men	20	1	1	49	3
All full-time women	8	0	1	15	2

[1] The column "Other/Unknown" includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander.

Note: Zero means less than one-half of one percent.

TABLE F.6 Percentages of part-time faculty belonging to various ethnic groups, by gender and type of department, in fall 2010. Except for round-off, the percentages within each departmental type sum to 100%.

	Percentage of part-time Faculty				
	Asian %	Black, not Hispanic %	Mexican American/ Puerto Rican/ other Hispanic %	White, not Hispanic %	Other/ Unknown[1] %
PhD Mathematics Departments					
All part-time men	5	2	1	47	6
All part-time women	4	1	1	30	3
MA Mathematics Departments					
All part-time men	3	4	2	40	9
All part-time women	3	3	2	29	6
BA Mathematics Departments					
All part-time men	2	1	0	43	8
All part-time women	1	1	0	38	5
All Statistics Departments					
All part-time men	2	4	0	65	5
All part-time women	1	0	0	18	6

[1] The column "Other/Unknown" includes the federal categories Native American/Alaskan Native and Native Hawaiian/Other Pacific Islander.

Note: Zero means less than one-half of 1%.

Chapter 5

First-Year Courses in Four-Year Colleges and Universities

The tables in this chapter explore the mathematics and statistics courses of four-year colleges and universities that generally are taught to beginning students. Tables S.6, S.7, S.8, S.9, S.13(A) and S.13(B) from Chapter 1, and Tables E.2, E.3, and E.5 from Chapter 3 are broken down by the level of department in this chapter to provide more information about the following courses, which tend to be the focus of the early college experience:

1. All introductory-level courses (Table FY.1)
2. College Algebra, Trigonometry, Precalculus (Tables FY.1, FY.2)
3. Introductory courses for pre-service elementary school teachers (Table FY.1)
4. Mainstream Calculus (Tables FY.3, FY.4)
5. Non-Mainstream Calculus (Table FY.5)
6. Elementary Statistics (Tables FY.6, FY.7, FY.8, and FY.9).

The introductory-level courses, listed in the 2010 Four-Year Mathematics Questionnaire (Appendix IV), are the same courses as in the 2005 survey: non-calculus courses for liberal arts students, Finite Mathematics, Business Mathematics, Mathematics for Elementary School Teachers, College Algebra, Trigonometry, Precalculus, Elementary Functions, Modeling, and "Other". Mainstream Calculus courses are the calculus courses needed for the mathematics major, or for applications in the physical sciences or engineering. Other calculus courses, which tend to be for business, social science, or life science majors, are labeled Non-Mainstream Calculus. In past CBMS surveys the elementary statistics courses are the statistics (or probability and statistics) courses that have no calculus prerequisite. In the 2010 CBMS survey, an introductory course (for non-majors) with a calculus prerequisite was added to the questionnaire.

Beginning courses build the interest and skills that students need for further study of mathematics and the many other disciplines that use mathematics or statistics. These courses constitute a substantial portion of four-year mathematics and statistics departments' course enrollments. Hence, these courses merit the careful consideration of the mathematical sciences community. The issues addressed in this chapter are the course enrollments, the appointment type of the course instructors, and the methods used in teaching these courses.

Standard errors: As the estimates produced from the survey data are broken down more finely, the estimates are made over smaller sets of departments, and the standard errors typically increase, sometimes to magnitudes that make the estimates rather uncertain. This phenomenon occurs particularly in the masters-level mathematics and statistics departments, which are smaller in number and possibly less homogeneous than the other levels of departments. Standard errors for all CBMS2010 tables can be found in Appendix VII.

Enrollments: (Tables FY.1, FY.3, FY.5, FY.6, FY.9, and Appendix I)

Table E.2 in Chapter 3 presented total enrollments, including distance-learning enrollments, in the first-year courses discussed in this chapter. The tables presented in this chapter do not include distance-learning enrollments. For comparison, Tables A.1, A.2, and A.3 in Appendix I give enrollments (with distance learning included) for fall 2000, 2005, and 2010 for each of the courses in the four-year mathematics and statistics questionnaires. Appendix I also gives the enrollments with distance learning excluded for fall 2010, except for advanced courses (where distance-learning enrollments were not gathered). Unless presented in some table in CBMS2005, the fall 2010 enrollments without distance learning are not comparable to enrollments in the 2005 or earlier CBMS survey reports. In the discussion that follows, we present enrollments without distance-learning enrollments whenever these are available for some preceding years; we use enrollments with distance learning included when necessary to compare to previous years.

Introductory courses:

- Of the introductory mathematics courses, the course titled "College Algebra" has the largest course enrollments (excluding distance-learning enrollments) for each level of department in fall 2010. The introductory mathematics course with the second highest enrollment in fall 2010 at doctoral-level mathematics departments is Precalculus, and at masters-level and bachelors-level departments the course is Mathematics for the Liberal Arts. See Table FY.1.

- The sum of the enrollments (including the distance-learning enrollments) in the courses listed on the four-year mathematics department CBMS questionnaire as “Finite Mathematics” and “Mathematics for the Liberal Arts” were 133,000 in 1995, 168,000 in 2000, and 217,000 in 2005, but only 209,000 in 2010. The Finite Mathematics enrollments were down 34% over 2005, while the Mathematics for the Liberal Arts enrollments were up 20% from 2005 to 2010. See Appendix I, Table A.1.

College Algebra, Trigonometry, Precalculus:

- The total enrollments in the cluster of the four courses that were listed on the questionnaire as College Algebra, Trigonometry, College Algebra and Trigonometry, and Precalculus (Elementary Functions) have been generally rising, except in the 2005 CBMS survey, where they showed a decline. The total (non-distance-learning) enrollments in these four courses at all four-year mathematics departments (combined) were roughly 368,000 in fall 1995, 386,000 in 2000, 352,000 in 2005, and 431,000 in 2010 (Table FY.1). Hence, there has been a 22% increase in total enrollment in these four courses since 2005 and a 17% increase since 1995. In fall 2010, the sum of the enrollments in these four classes represented 21% of all doctoral-level undergraduate enrollments, 22% of masters-level undergraduate enrollments, and 24% of bachelors-level enrollments (in all cases, distance-learning enrollments are excluded). See Table FY.1.

Introductory mathematics courses for pre-service elementary teachers:

- Non-distance-learning enrollments in introductory courses in mathematics departments designed for pre-service elementary teachers continued an increasing trend. In fall 1995, the enrollment was roughly 59,000, in 2000 it was 68,000, in 2005 it was 72,000, and in 2010 it rose to 80,000, up 36% since 1995 and 11% over 2005. See Table FY.1.

Mainstream Calculus:

- Mainstream Calculus I had (non-distance-learning) enrollment in fall 2010 of roughly 233,000, up 16% from fall 2005 (Chapter 1, Table S.6) and up 23% from fall 2000 (CBMS2005, Chapter 1, Table S.7). Most of the enrollment gains took place at the masters- and bachelors-level departments (masters-level Mainstream Calculus I enrollment was up 37%, and bachelors-level Mainstream Calculus I enrollment was up 31% from 2005 to 2010). See Table FY.3.
- Mainstream Calculus II had (non-distance-learning) enrollment in fall 2010 of roughly 128,000. The CBMS2005 survey had reported enrollments of 85,000, and the 2000 survey reported enrollments of 87,000. Hence, in fall 2010, the enrollment in Mainstream Calculus II was up 51% over 2005. Most of the enrollment growth occurred at masters- and bachelors-level departments. See Table FY.3.

Non-Mainstream Calculus:

An error in the 2010 four-year mathematics department CBMS survey instrument clouds the interpretation of the data for Non-Mainstream Calculus. The questionnaire asked for enrollments in Non-Mainstream Calculus I (broken down by lecture/recitation sections, classes with 30 or fewer students, and classes with enrollments larger than 30), followed by a request for “Non-Mainstream Calculus I, II, III, etc.” enrollments (not broken down by various section sizes). The intention had been to combine all Non-Mainstream Calculus enrollments <u>above</u> Non-Mainstream Calculus I, and hence, Non-Mainstream Calculus I should not have been included in the second list of courses. From other data provided, it was clear that some departments listed Non-Mainstream Calculus I enrollments in both rows, and reviewing the data, with some follow-up correspondence with some of the departments, the data were interpreted as best as could be.

- With the above caveats, Table FY.5 shows that Non-Mainstream Calculus I enrollment (not including distance-learning courses) was 99,000 in fall 2010, compared to 108,000 in fall 2005 (according to CBMS2005 Table FY.6), with almost the entire decline occurring at bachelors-level departments. Given the number of students obtaining credit for AP Mainstream Calculus I (see Chapter 3, Table E.15) and the rise in Mainstream Calculus I enrollments, perhaps it is not surprising that Non-Mainstream Calculus I enrollments would decline, particularly at the bachelors-level institutions. See Table FY.5.
- The 2010 survey data, interpreted as explained, showed that the Non-Mainstream Calculus II, III, etc. enrollment (excluding distance-learning courses) of roughly 22,000 in fall 2010 was double the fall 2005 enrollment (excluding distance learning courses) in Non-Mainstream Calculus II (CBMS2005, Table S.8). Comparing enrollments that include distance learning (since those were the only enrollments for these courses that are broken down by level of department in the 2005 report) that appear in Appendix I, Table A.1, almost all of the growth occurred at the masters- and

bachelors-level departments. The rise in these enrollments may be due to the broadened description of Non-Mainstream Calculus II to include other courses, and it is also possible that some departments entered their Non-Mainstream Calculus I enrollment in the Non-Mainstream Calculus I, II, III, etc. row (as we noted, Non-Mainstream Calculus I enrollments were lower in 2010 than in 2005), though some departments verified that their Non-Mainstream Calculus II, III, etc. enrollments actually were larger than their Non-Mainstream Calculus I enrollments. More clarity in the statistics for Non-Mainstream Calculus courses should come with the 2015 survey. See Table FY.5.

Elementary Statistics:

The 2010 four-year mathematics CBMS questionnaire listed four elementary statistics courses: (F1) Introductory Statistics (no calculus prerequisite), (F2) Introductory Statistics (calculus prerequisite, for non-majors), (F3) Probability and Statistics (no calculus prerequisite), and (F4) other introductory probability and statistics courses. Course F2 was included in the CBMS survey for the first time in 2010.

- Total (including distance-learning) enrollments in elementary probability and statistics courses taught in mathematics departments of four-year colleges and universities (the sum of courses F1, F2, F3, and F4 from the four-year mathematics questionnaire) have increased to roughly 231,000 in fall 2010, up 56% over 2005 (CBMS2005, Appendix I, Table A.2). Without including the course F2 enrollments, the sum of the enrollments (including distance learning) for courses F1, F3, and F4 in mathematics departments was roughly 205,000 in 2010, up 39% from 2005.
- Table FY.6 presents the (non-distance-learning) enrollments in Introductory Statistics (no calculus prerequisite, course F1) and Probability and Statistics (no calculus prerequisite, the sum of courses F3 and F4), which both are significantly up in 2010 over 2005 at the doctoral- and bachelors-level departments. In addition to the enrollments in these courses, Appendix I, Table A.2 shows that course F2, Introductory Statistics (with a calculus prerequisite, for non-majors), enrolled an additional 23,000 students (non-distance-learning), producing a total elementary probability and statistics enrollment (not including distance-learning courses) in four-year mathematics departments of 218,000 students, just below the Mainstream Calculus I enrollments. See Table FY.6 and Appendix I, Table A.2.

The 2010 four-year statistics department questionnaire listed five elementary statistics courses. Listed courses for non-majors/minors were (E1) Introductory Statistics (no calculus prerequisite) and (E2) Introductory Statistics (calculus prerequisite, not for majors). Other listed introductory courses were (E3): Statistics for Pre-service Elementary or Middle School Teachers, (E4): Statistics for Pre-service Secondary School Teachers, and (E5): Other elementary-level statistics courses.

- The 2010 CBMS survey was the first survey in which an introductory statistics course for non-majors/minors with a calculus prerequisite was listed on the CBMS statistics questionnaire, and in fall 2010, this course enrolled (not including distance-learning enrollments) roughly 16,000 students, compared to roughly 56,000 in the introductory course without a calculus prerequisite (Table FY.9). The enrollment of 56,000 in the introductory statistics course without a calculus prerequisite represents a 33% increase over the 2005 non-distance-learning enrollment in that course (see CBMS2005, Table FY.10, p. 131). See Table FY.9.
- When all introductory statistics department enrollments (including distance-learning enrollments) for courses E1 through E5 are combined, statistics departments had a total enrollment of roughly 81,000 students in introductory statistics courses for non-majors/minors, a 50% increase from the enrollment of roughly 54,000 in 2005 (CBMS2005, Appendix I, Table A.2). This enrollment in statistics department introductory courses was a little more than one-third of the enrollment in all of the elementary probability and statistics courses in four-year mathematics departments. See Table FY.9 and Appendix I, Table A.2.

Appointment Type of First-Year Course Instructors (Tables FY.1, FY.3, FY.5, FY.6, FY.9)

In Chapter 3, the appointment type of course instructors was considered for various course categories; in this chapter, the appointment type of instructors in first-year courses is considered, and these data are broken down by the level of the department. For the CBMS2010 survey, faculty at four-year institutions were split into four categories: tenured, tenure-eligible, and permanent faculty (TTE), other full-time faculty (OFT) who are full-time but not TTE, part-time faculty, and graduate teaching assistants (GTAs). A course was to be reported as being taught by a GTA if and only if the GTA was the “instructor of record” for the course. GTAs who ran discussion or recitation sections as part of a lecture/recitation course were not included in this category.

In past CBMS surveys, the TTE category was labeled “tenured/tenure-eligible” on the survey questionnaire without the word “permanent”, but in the instructions, departments at institutions that did not recognize

TABLE FY.1 Percentage of sections (excluding distance-learning sections) of certain introductory-level courses taught by various types of instructors in mathematics departments in fall 2010, by type of department. Also average section sizes and enrollments (not including distance learning enrollments). For comparison, some enrollments in these courses are in Table FY.2, p. 116, in CBMS2005.

	Percentage of sections taught by																				
	Tenured/ tenure-eligible/ permanent [1] %			Other full-time %			Part-time %			Graduate teaching assistants %			Unknown %			Average Section Size			Enrollment (1000s)		
Course & Department Type	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Mathematics for Liberal Arts	16	34	40	24	22	18	17	38	30	20	0	0	23	6	12	43	33	28	43	38	60
Finite Mathematics	10	32	43	47	26	5	14	35	40	22	0	0	7	7	12	59	29	25	27	8	25
Business Math (non-calculus)	10	25	66	40	24	12	17	48	21	25	0	0	9	3	2	52	32	20	22	12	11
Math for Elem Sch Teachers	20	57	53	35	21	7	15	19	27	14	0	0	16	2	12	29	28	24	15	29	36
College Algebra	5	20	34	39	27	18	16	26	32	28	19	0	12	7	16	47	34	30	88	55	99
Trigonometry	8	36	59	27	34	13	15	19	25	42	0	0	7	11	3	45	30	32	16	9	16
College Alg & Trig (combined)	9	33	31	33	27	14	14	23	55	33	0	0	11	17	1	49	38	31	18	7	12
Elem Functions, Precalculus	5	25	48	33	23	17	27	36	30	28	13	0	8	3	5	47	30	25	46	28	39
Intro to Math Modeling	8	62	75	20	0	7	43	38	9	23	0	0	6	0	9	41	40	23	4	1	3
All other intro-level non-Calculus courses	31	23	49	21	26	21	18	45	21	25	6	0	4	0	9	68	28	25	15	18	33
Total All Intro Level Courses	8	27	41	32	26	14	23	33	34	25	9	0	12	5	11	44	31	26	292	206	336

Note: 0 means less than one half of 1%. Inconsistencies in column sums are due to round-off.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

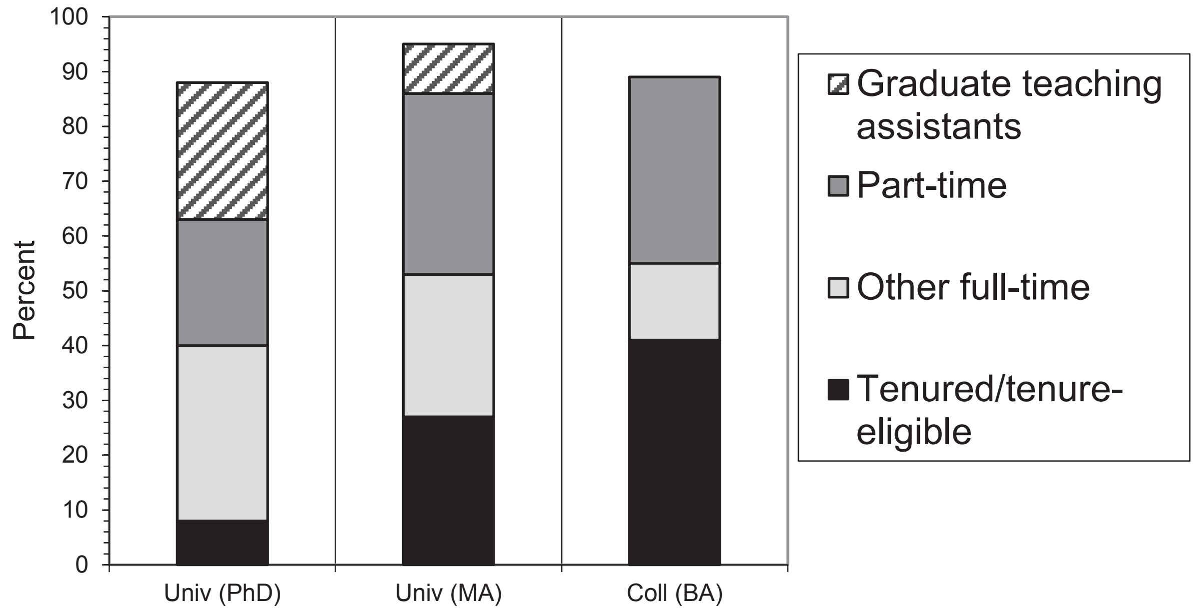

FIGURE FY.1.1 Percentage of sections (excluding distance-learning sections) in introductory-level mathematics courses taught in mathematics departments by various kinds of instructors in fall 2010, by type of department. (Deficits from 100% represent unknown instructors.)

tenure (estimated at 12% of all four-year mathematics departments in the CBMS2010 survey and 5% in the CBMS2005 survey) were instructed to place permanent faculty in the TTE category. The 2010 survey directors decided to add the label "permanent" to the TTE category, and this change may have added to the TTE category other instructors who have teaching positions that are regarded as permanent, although these faculty do not have tenure and are not eligible for tenure, even if their institution recognizes tenure. The instructions did not define "permanent" beyond the situation where the institution does not recognize tenure, but it seems quite possible that some departments interpreted "permanent faculty" to have this additional meaning, and some of the data suggest that this was the case. Hence, the addition of the word "permanent" may mean that faculty who might be classified as "teaching faculty" who have renewable contracts but are not tenured or tenure-eligible may have been added to the TTE category, even if the institution recognizes tenure. As a consequence of this change, the other full-time category probably consists primarily of postdocs and other temporary academic visitors.

The 2010 CBMS survey followed the practice established in the 2005 survey of presenting findings in terms of percentages of "sections" offered. In analyzing the 2010 survey data, it seems that the notion of "section" varies somewhat among different departments, particularly for lower-level classes that may be taught with a laboratory component. A further, and possibly related, problem experienced in the 2010 survey was the inconsistent numbers of faculty and sections reported by some departments; this problem had occurred in past surveys and was resolved by creating the category of "unknown" instructors. The 2010 survey produced increased numbers of "unknown" faculty over past surveys, making it difficult to draw conclusions about changes in the percentages of the various ranks of instructors teaching specific courses. When comparing data from CBMS2000 and earlier surveys, one must keep in mind a change made in 2005. In some cases, CBMS2000 and earlier surveys presented data on who taught the course in terms of percentages of enrollments rather than percentages of sections.

- Table FY.1 and Figure FY.1.1 present data on who taught introductory-level courses. At doctoral-level mathematics departments, the courses with the lowest percentages of TTE faculty instructors were the cluster of four introductory classes (college algebra, trigonometry, algebra and trigonometry, and precalculus classes); at doctoral-level mathematics departments, over all introductory classes (combined), only 8% of the sections were taught by TTE faculty, 32% by other full-time, 23% by part-time faculty, and 25% by GTAs. At the bachelors-level mathematics departments, 41% of introductory classes were taught by TTE faculty, 14% by OFT faculty, and 34% were taught by

TABLE FY.2 Percentage of sections of College Algebra in which various practices in teaching are used by mathematics departments at four-year colleges and universities in fall 2010.

	Univ (PhD)		Univ (MA)		College (BA)		Total	
Practices used in teaching College Algebra	Percentage of all sections, nationally	Mean of department-reported percentages	Percentage of all sections, nationally	Mean of department-reported percentages	Percentage of all sections, nationally	Mean of department-reported percentages	Percentage of all sections, nationally	Mean of department-reported percentages
a. Emphasize problem solving in the modeling sense	38	38	64	60	40	54	44	53
b. Include elementary data analysis	35	24	19	27	25	26	27	26
c. Include writing assignments	11	13	21	15	17	28	16	23
d. Include small group activities	26	24	44	38	39	47	36	42
e. Include small group projects	11	3	32	20	23	27	20	22
f. Include class presentations	4	5	4	4	14	15	9	12
g. Use graphing calculators	46	46	77	78	73	75	66	72
h. Use spreadsheets	1	1	10	0	7	11	5	8
i. Use online homework generating and grading packages	76	71	75	60	58	54	68	58
j. Use classroom response systems (e.g., clickers)	13	10	0	0	10	9	9	8
k. Primarily use a traditional approach	60	64	65	68	69	72	65	70

TABLE FY.3 Percentage of sections (excluding distance-learning sections) in Mainstream Calculus I and Mainstream Calculus II taught by various types of instructors in four-year mathematics departments in fall 2010, by size of sections and type of department. Also average section sizes and enrollments (not including distance-learning enrollments). This table can be compared to Table FY.3, p. 117 and, for enrollments, to Table FY.4, p.119 of CBMS2005.

	Percentage of sections taught by																				
	Tenured/ tenure- eligible/ permanent [1] %			Other full-time %			Part-time %			Graduate teaching assistants %			Unknown %			Average Section Size			Enrollment (1000s)		
Course & Department Type	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Mainstream Calculus I																					
Lecture / recitation	33	82	50	29	18	8	12	0	32	19	0	0	7	0	10	71	39	31	70	8	28
Regular section <31	41	56	70	20	22	17	5	12	11	24	0	0	9	11	2	24	25	20	7	7	35
Regular section >30	25	60	63	35	8	2	9	22	13	19	5	0	11	4	22	39	35	35	34	26	18
Total Mainstream Calculus I	31	63	63	30	13	12	10	16	17	20	3	0	9	5	8	52	33	25	110	41	82
Mainstream Calculus II																					
Lecture / recitation	48	97	45	24	3	9	11	0	44	10	0	0	7	0	2	72	39	34	37	3	21
Regular section <31	49	71	83	20	11	6	9	1	5	21	0	0	1	16	6	24	21	18	5	3	14
Regular section >30	39	62	55	31	9	8	9	2	5	12	23	0	9	4	32	40	35	35	19	18	9
Total Mainstream Calculus II	45	67	64	26	9	8	10	2	18	13	16	0	7	6	10	51	32	26	61	23	44
Total Mainstream Calculus I & II	36	64	64	29	11	10	10	11	18	17	8	0	8	5	9	52	33	26	171	65	126

Note: 0 means less than one half of 1%. Inconsistencies in column and row sums are due to round-off.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

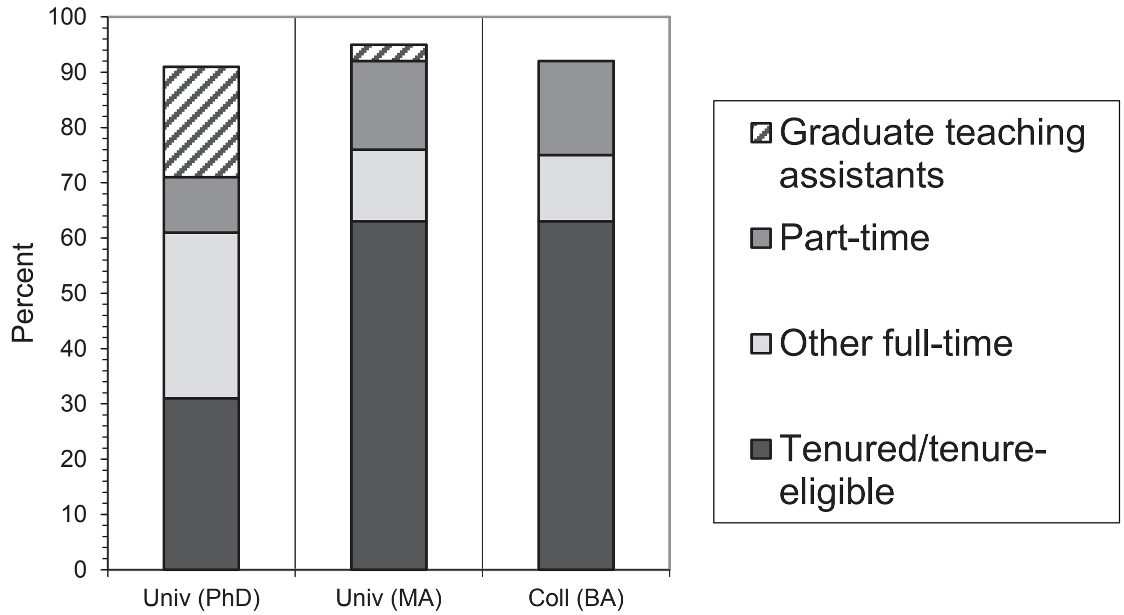

FIGURE FY.3.1 Percentage of sections (excluding distance learning) in Mainstream Calculus I in four-year mathematics departments by type of instructor and type of department in fall 2010. (Deficits from 100% represent unknown instructors.)

TABLE FY.4 Percentage of four-year mathematics departments with various practices in teaching Honors Calculus in fall 2010, by type of department.

	Mathematics Departments			
	Univ (PhD)	Univ (MA)	College (BA)	All Depts. Combined
Percentage that offer an Honors Calculus course	65	26	10	20
Of those that offer Honors Calculus, the percentage of depts that offer it for:				
Calculus I	71	73	66	69
Calculus II	88	85	97	91
Calculus III	74	32	17	48
Of those that offer Honors Calculus, compared to Mainstream Calculus, the percentage of departments where Honors Calculus:				
Contains more theory	95	84	84	89
Contains more applications	57	59	88	69
Is aimed at mathematics majors	32	56	43	40
Requires a test or placement mechanism as a prerequisite	75	95	59	72
Can be selected by any interested student	18	5	17	15

TABLE FY.5 Percentage of sections (excluding distance-learning sections) in Non-Mainstream Calculus I and in Non-Mainstream II, III, etc.[2] taught by various types of instructors in mathematics departments in fall 2010, by size of sections and type of department. Also average section size and enrollments (not including distance-learning enrollments). This table can be compared to Table FY.5, p. 121 and, for enrollments, to Table FY.6, p. 123 in CBMS2005.

	Percentage of sections taught by																				
	Tenured/ tenure-eligible/ permanent [1] %			Other full-time %			Part-time %			Graduate teaching assistants %			Unknown %			Average Section Size			Enrollment (1000s)		
Course & Department Type	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Non-Mainstream Calculus I																					
Lecture / recitation	31	60	29	28	20	39	17	20	26	15	0	0	9	0	6	74	33	29	27	3	5
Regular section <31	16	43	41	21	23	15	11	20	32	45	2	0	7	13	12	27	25	22	6	3	7
Regular section >30	18	31	44	33	16	13	13	38	25	24	0	0	13	15	18	52	39	36	27	15	5
Total Non-Mainstream Calculus I	22	38	39	29	18	20	14	32	29	25	0	0	10	12	12	54	35	27	60	22	17
Total Non-Mainstream Calculus II, III, etc [2]	18	22	60	21	32	0	12	44	10	25	0	0	24	3	31	35	33	19	12	5	5
Total Non-Mainstream Calculus I, II, III, etc.	21	35	45	27	21	14	13	34	23	25	0	0	13	11	18	50	35	25	72	27	23

Note: 0 means less than one half of 1% in columns 1 through 18. Inconsistences in row and column sums are due to round-off.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

[2] The 2010 survey mistakenly asked for *Non-mainstream Calculus I, II, and III, etc.*; the data here are our best estimate for *Non-mainstream Calculus II, III, etc.*

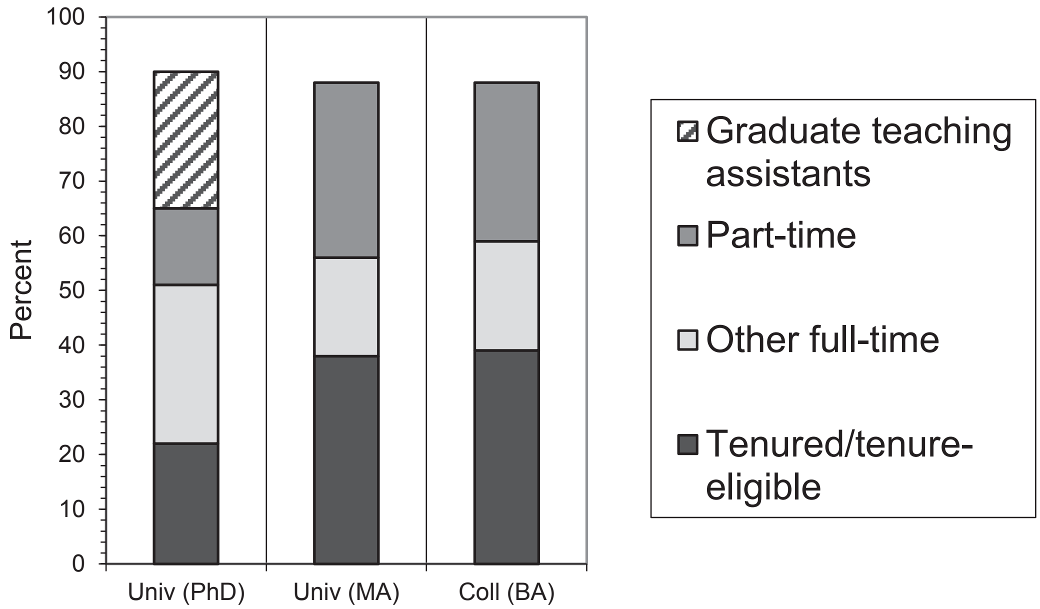

FIGURE FY.5.1 Percentage of sections (excluding distance-learning sections) in Non-mainstream Calculus I in four-year mathematics departments taught by various kinds of instructors, by type of department in fall 2010. (Deficits from 100% represent unknown instructors.)

part-time faculty. The percentages for masters-level departments were generally in between the doctoral- and the bachelors-level departments. See Table FY.1 and Figure FY.1.1.

- Table FY.3 and Figure FY.3.1 present data on who taught Mainstream Calculus I and II. For Mainstream Calculus I, at doctoral-level mathematics departments, over all types of sections, 31% of the sections were taught by TTE faculty, while at the bachelors- and masters-level mathematics departments, over all types of sections, 63% of Mainstream Calculus I sections were taught by TTE faculty. In 2005, these percentages were 36% for doctoral-level departments, 73% for masters-level departments, and 79% for bachelors-level departments. The average section size for the total Mainstream Calculus I at the doctoral-level departments was double that of the bachelors-level departments, and the average section sizes in 2010 were close to those in 2005. Across all types of faculty in fall 2010, the percentages of faculty teaching Mainstream Calculus II and its average section size were relatively close to those for Mainstream Calculus I. A notable change from 2005 was the percentage of TTE faculty who taught Mainstream Calculus II at bachelors-level departments: down to 64% in 2010 from 94% in 2005, though there is a large standard error (13%) in the 2010 estimate. See Table FY.3 and Figure FY.3.1.
- Table FY.5 and Figure FY.5.1 present data on who taught Non-Mainstream Calculus. At the doctoral level, for Non-Mainstream Calculus I in fall 2010, slightly over 20% of the sections were taught by TTE faculty, while at the bachelors- and masters-level, this percentage was slightly under 40%. This is a notable decrease from 2005, when these percentages were 43% at doctoral-level departments, 45% at masters-level departments, and 68% at bachelors-level departments (but there are large standard errors for masters- and bachelors-level estimates in 2010). The average section sizes of Mainstream and Non-Mainstream Calculus I in 2010 are approximately the same size, and the average section size across all sections of Non-Mainstream Calculus I was up by 2 students in 2010 over 2005 at each of the three levels of departments.
- Table FY.6 and Figure FY.6.1 present data on who taught three elementary probability and statistics courses that do not have a calculus prerequisite in mathematics departments of four-year colleges and universities. At the doctoral-level mathematics departments, almost 25% of the total sections of the three courses were taught by TTE faculty, while at the bachelors- and masters-level departments, the percentage was roughly 50%. This percentage was about the same at the doctoral- and masters-level departments and was slightly down from the percentages in 2005 at the bachelors-level depart-

TABLE FY.6 Percentage of sections (excluding distance-learning sections) in Elementary Statistics (non-Calculus) and Probability and Statistics (non-Calculus) taught by various types of instructors in mathematics departments in fall 2010, by size of sections and type of department. Also average section size and enrollments (not including distance learning enrollments). Comparable 2005 data is in CBMS2005, Table FY.7, p. 125 and for enrollments, in Table FY.8, p. 127.

	Percentage of sections taught by																				
	Tenured/ tenure-eligible/ permanent [1] %			Other full-time %			Part-time %			Graduate teaching assistants %			Unknown %			Average Section Size			Enrollment (1000s)		
Course & Mathematics Department Type	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Elementary Statistics (F1) (non-calculus)																					
Lecture / recitation	36	66	43	22	18	3	10	3	32	21	0	0	11	13	21	48	38	30	6	6	34
Regular section <31	6	39	50	28	22	16	6	35	27	29	1	0	31	3	8	27	20	22	4	4	46
Regular section >30	23	50	56	25	15	16	20	30	8	31	0	0	1	5	21	65	38	37	28	16	30
Total Elementary Statistics	22	50	49	25	18	12	15	26	24	29	0	0	9	6	14	55	33	27	38	27	110
Probability & Statistics (non-Calculus) (F3 + F4)	30	52	47	17	10	7	15	24	21	20	5	7	18	9	18	57	32	25	4	7	9
Total, all non-calculus elementary probability & statistics courses	23	51	49	24	16	12	15	25	24	28	1	1	10	7	14	55	33	27	42	34	119

Note: 0 means less than one half of 1%. Some row and column sums appear inconsistent due to round-off.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

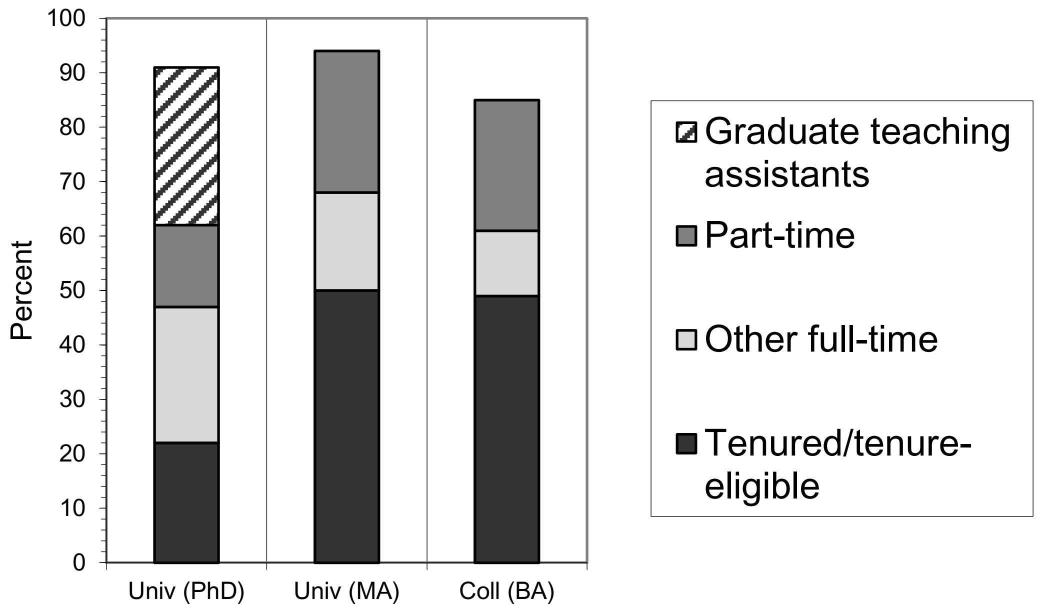

FIGURE FY.6.1 Percentage of sections (excluding distance-learning sections) in Elementary Statistics (non-Calculus) in four-year mathematics departments, by type of instructor and type of department in 2010. (Deficits from 100% represent unknown instructors.)

ments. At doctoral-level departments, about 28% of the sections of the combined courses were taught by GTAs (compared to 22% in 2005). The average section size at doctoral-level mathematics departments was up from 47 students in 2005 to 55 students in 2010 (but with a standard error of about 7 students).

- Table FY.9 and Figure FY.9.1 present data on who taught introductory probability and statistics courses for non-majors/minors in statistics departments. The percentage of TTE faculty who taught the course (labeled E2 on the statistics questionnaire) with a calculus prerequisite was 36% at doctoral-level departments and 59% at masters-level departments, while the course without the calculus prerequisite (course E1) had TTE faculty teaching 19% of the sections in doctoral-level departments and 44% of masters-level departments (smaller percentages than for the no-calculus-prerequisite course taught in mathematics departments). At doctoral-level departments, the percentage of sections taught by GTAs was 24% for course E1 (about the same as in 2005) and half that percentage for course E2. The average section sizes for the no-calculus-prerequisite statistics course taught in mathematics departments (course F1) and statistics departments (course E1) were about the same.

Teaching Methods (Tables FY.2, FY.4, FY.7, FY.8)

College Algebra (Table FY.2):

The questions on the teaching of College Algebra were constructed with the help of the MAA's CRAFTY (Curriculum Renewal Across the First Two Years) committee that had written a report [CRAFTY] on the teaching of College Algebra. The precise wording of the questions can be found by consulting the Four-Year Mathematics Questionnaire, question H1, located in Appendix IV. The survey instrument instructed each department to give the number of sections of the course College Algebra to which each of 11 aspects of College Algebra pedagogy applied. Table FY.2 presents two different averages: first, the overall average number of sections where each aspect is present (i.e., the total number of sections in the U.S. where the aspect was present, divided by the number of all sections of College Algebra in the U.S.), and second, the average of the departmental average numbers of sections where the aspect is present (i.e. for each department, the number of sections where the aspect was present was divided by the number of sections of College Algebra at that department, then the average of these averages was computed); the table is broken down by the level of the department. About two-thirds of each level of department described their College Algebra course as "primarily

TABLE FY.7 Percentage of mathematics departments using various practices in the teaching of Elementary Statistics (no calculus prerequisite) in fall 2010 by type of department.

	Mathematics Departments			
	Univ (PhD)	Univ (MA)	College (BA)	All Depts. Combined
Percentage of departments that offer elementary statistics course with no calculus prerequisite	58	90	87	84
Of those that offer the course, the percentage of departments in which the majority of sections use real data for the following percentages of class sessions:				
0-20%	33	29	15	18
21-40%	18	15	30	27
41-60%	26	14	20	19
61-80%	5	12	18	16
81-100%	18	30	18	20
Percentage of departments where the majority of sections use in-class demonstrations for the following percentages of class sessions:				
0-20%	36	23	10	14
21-40%	21	9	33	29
41-60%	20	16	11	13
61-80%	6	16	29	25
81-100%	16	35	17	19
Percentage of departments using the following kinds of technology in the majority of sections:				
Graphing calculators	52	79	72	71
Statistical packages	49	63	54	55
Educational software	26	16	18	19
Applets	20	15	17	17
Spreadsheets	57	55	50	51
Web-based resources	61	53	54	54
Classroom response systems	11	9	10	10
Percentage of departments where the majority of sections require assessments beyond homework, exams, and quizzes	24	51	46	45

using a traditional approach (i.e., sections that were basically the same College Algebra course that was taught in 1990)". The "modeling approach: model => data => interpretation" was used most heavily at the masters-level departments. Graphing calculators were used in about three-quarters of the masters- and bachelors-level departments sections, and less than half of the doctoral-level sections. Online homework was used in about three-fourths of the sections at the doctoral- and masters-level departments, and a little over half of the bachelors-level departments. Of the less traditional methods, small group activities seemed to be used the most frequently–overall at 26% of the doctoral-level departments, 44% of the masters-level departments, and 39% of the bachelors-level departments.

Calculus (Table FY.4):

Since there was another major national study of calculus instruction ("Characteristics of Successful Programs in College Calculus") (http://www.maa.org/cspcc/) conducted parallel to the CBMS2010 survey, the CBMS survey restricted its questions about calculus pedagogy to a topic not covered in the other survey, namely "honors calculus" courses. Table FY.4 shows that 65% of doctoral-level, 26% of masters-level, and 10% of bachelors-level departments offered some kind of honors calculus course in fall 2010. Of departments that offered such a course, of the three levels of calculus at which such a course might be offered, Calculus II had the largest percentage of departments offering it. A third question asked about how honors calculus differed from Mainstream Calculus, and typically it covered more theory than Mainstream Calculus (at 95% of doctoral-level departments and 84% of both masters- and bachelors-level departments), though at bachelors-level departments it was even slightly more likely to cover more applications than Mainstream Calculus. According to Table FY.4, such "honors" courses typically required some sort of selection procedure, though at 17% of all levels of departments the course could be selected by any student.

Elementary Statistics (Tables FY.7 and FY.8):

As already noted, probability and statistics course enrollments have expanded, and there has been considerable interest in how these courses are taught, particularly since they are often taught outside of statistics departments (see e.g. [CAUSE], [GAISE], [Moore]). The CBMS2010 pedagogy questions about statistics courses focused on the course "Introductory Statistics (no calculus prerequisite)" in mathematics departments (course F1 in the Four-Year Mathematics Questionnaire) and "Introductory Statistics (no Calculus prerequisite) for non-majors/minors" in statistics departments (course E1 in the Four-Year Statistics Questionnaire). The questions for four-year mathematics departments were the same as the questions in Section G of the statistics questionnaire, and they begin with question H5 in the mathematics questionnaire. The same questions were used in both instruments so that the results (Table FY.7 for mathematics departments and Table FY.8 for statistics departments) can be compared; each of these tables is broken down by level of department.

Generally, the results of the CBMS survey indicated that in teaching elementary statistics, in fall 2010, statistics departments made more use of real data, modern technology, and in-class activities that encourage student involvement than mathematics departments did. However, mathematics departments held a small edge in assigning projects beyond routine assignments. All of these aspects have been cited as important elements in teaching elementary statistics courses.

Table FY.7 shows that an elementary statistics course, with no calculus prerequisite, was offered at over half of the doctoral-level mathematics departments and at about 90% of the masters-level and bachelors-level mathematics departments. Table FY.8 shows that an elementary statistics course for non-majors/minors, with no calculus prerequisite, was offered at 90% of the doctoral-level statistics departments and at 85% of the masters-level statistics departments. The remaining table entries contain percentages of sections from departments that offered these courses. The distribution of class sessions in which real data was used shows that this distribution is more skewed to lower use of real data at mathematics departments than at statistics departments (see Tables FY.7 and FY.8), and among mathematics departments, the doctoral departments typically reported fewer sessions spent using real data than the bachelors-level departments (with the masters-level departments generally between the doctoral-level and bachelors-level; see Table FY.7). Both tendencies were also present regarding class sessions spent using "in-class demonstrations and/or in-class problem solving activities/discussions". Among mathematics departments, graphing calculators were used at about three-quarters of the bachelors-level and masters-level departments, at a little over half of the doctoral-level mathematics departments (Table FY.7), and at under 50% of statistics departments (Table FY.8). Statistical packages were used in 87% of statistics departments but only in 55% of mathematics departments (66% at masters-level departments), so statistics departments were generally using the more sophisticated technology. Similarly, educational software was used in 40% of the statistics department sections but only in 19% of all mathematics department sections (26% of doctoral-level mathematics department sections). Applets were used in 34% of statistics department sections and in 17% of mathematics department

TABLE FY.8 Percentage of statistics departments using various practices in the teaching of Introductory Statistics for non-majors/minors (no calculus prerequisite) in fall 2010 by type of department.

	Statistics Departments		
	Univ (PhD)	Univ (MA)	All Depts. Combined
Percentage of departments that offer Introductory Statistics for non-majors/minors with no calculus prerequisite	90	85	88
Of those that offer the course, the percentage of departments in which the majority of sections use real data the following percentages of the time:			
0-20%	6	20	9
21-40%	16	20	17
41-60%	21	0	16
61-80%	24	10	20
81-100%	34	50	38
Percentage of departments where the majority of sections use in-class demonstrations in the following percentages of class sessions:			
0-20%	22	10	19
21-40%	16	40	22
41-60%	21	0	16
61-80%	16	20	17
81-100%	24	30	26
Percentage of departments using following kinds of technology in the majority of sections			
Graphing calculators	45	33	43
Statistical packages	89	80	87
Educational software	38	44	40
Applets	31	44	34
Spreadsheets	45	56	48
Web-based resources	79	60	74
Classroom response systems	26	40	29
Percentage of departments where the majority of sections require assessments beyond homework, exams, and quizzes	31	50	36

sections, while spreadsheets were used at roughly half of all surveyed departments. Web-based resources were used in 74% of statistics department sections and in 54% of mathematics department sections (61% at doctoral-level mathematics department sections). Classroom response systems (e.g. clickers) were used in 29% of statistics department sections and in 10% of mathematics department sections. One aspect of reform pedagogy in which mathematics departments held a slim advantage was in the use of non-routine assignments. A slightly higher percentage of mathematics department sections (45%, but only 24% of doctoral-level department sections) than statistics department sections (36%) had assessments beyond homework, exams, and quizzes (e.g. projects, oral presentations, or written reports).

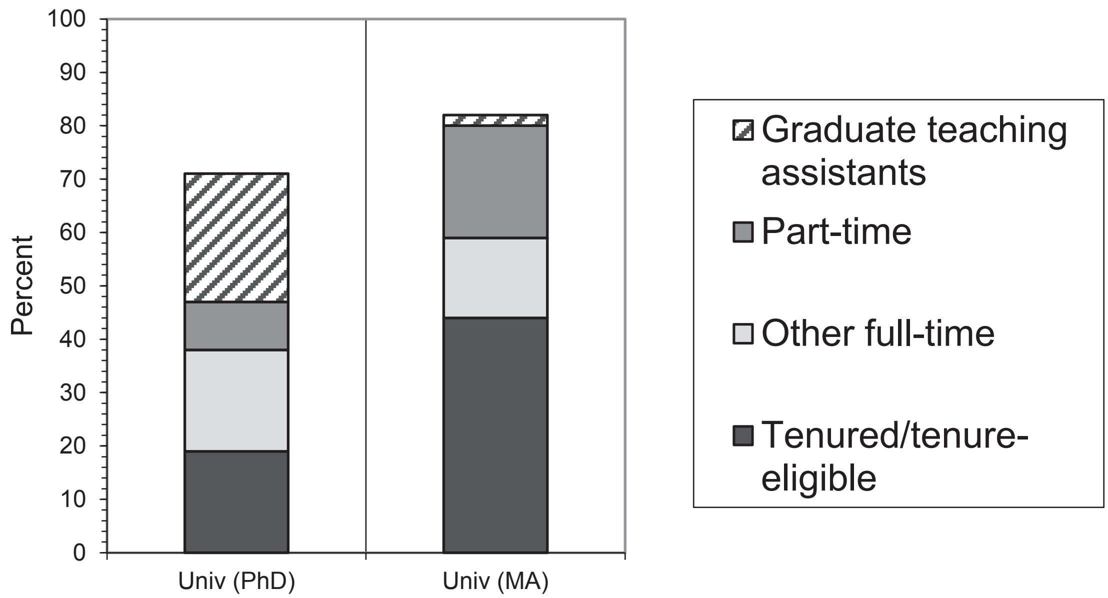

FIGURE FY.9.1 Percentage of sections (excluding distance-learning sections) in Elementary Statistics (non-Calculus) taught in statistics departments in fall 2010, by type of instructor and type of department. (Deficits from 100% represent unknown instructors).

TABLE FY.9 Percentage of sections (excluding distance-learning sections) in Introductory Statistics (non-Calculus for non-majors/minors) and Introductory Statistics (Calculus prerequisite for non-majors/minors) taught by various types of instructors in statistics departments in fall 2010, by size of sections and type of department. Also average section size and total (non-distance-learning) enrollments. Enrollments in 2005 can be found in Table FY.10, p.131 of CBMS2005.

	Percentage of sections taught by															
	Tenured/ tenure-eligible permanent [1] %		Other full-time (with PhD) %		Other full-time (without PhD) %		Part-time %		Graduate teaching assistants %		Unknown %		Average Section Size		Enrollment (1000s)	
Course & Statistics Department Type	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA
Introductory Statistics (non-Calculus for non-majors/minors)																
Lecture / recitation	19	27	11	5	13	5	11	17	18	5	27	41	65	54	29	9
Regular section <31	32	49	17	1	0	27	13	23	15	0	24	0	16	26	1	4
Regular section >30	17	63	5	0	4	9	4	24	39	0	31	4	47	29 [2]	10	4
Total Introductory Statistics (non-Calculus)	19	44	10	2	9	13	9	21	24	2	28	17	55	37	40	17
Introductory Statistics (calculus prerequisite for non-majors/minors)																
Lecture / recitation	36	32	14	32	4	0	11	5	13	0	23	32	50	34	6	1
Regular section <31	32	67	10	6	1	6	3	3	6	11	47	8	15	44 [2]	1	3
Regular section >30	39	76	13	6	1	0	17	6	17	6	13	6	36	42	4	1
Total Introductory Statistics (Calculus)	36	59	13	13	2	3	11	4	12	7	26	15	36	40	11	5

Note: 0 means less than one half of 1%. Row and column sums may appear inconsistent due to round-off.

[1] Beginning in 2010, the CBMS survey added the word "permanent" to the description "tenured/tenure eligible" that was used previously.

Chapter 6

Enrollment, Course Offerings, and Instructional Practices in Mathematics Programs at Two-Year Colleges

This chapter reports fall 2010 enrollment and instructional practices in mathematics and statistics courses at public two-year colleges in the United States. Also included are total enrollment for these two-year colleges, average mathematics class size, trends in availability of mathematics courses, enrollment in mathematics courses offered outside of the mathematics programs, and services available to mathematics students. Many tables contain data from previous CBMS surveys (1975, 1980, 1985, 1990, 1995, 2000 and 2005) and hence allow for historical comparisons. Further analysis of many of the items discussed in this chapter can be found in Chapter 1, where they are discussed from a comprehensive point of view in comparison to similar data for four-year colleges and universities.

In the 1990 and earlier CBMS surveys, computer courses taught outside the mathematics department, and the faculty who taught them, were considered part of the "mathematics program." By 1995, computer science and data processing programs at two-year colleges, for the most part, were organized separately from the mathematics program. Hence, in 1995, 2000, 2005, and again in this 2010 report, such outside computer science courses and their faculty are not included in mathematics program data. In 1995, enrollment data were collected about computer courses taught within the mathematics program and can be found in those reports. But because such courses had become rare, the 2005 and 2010 surveys contained no specific data about even these "inside mathematics program" computer courses, though some, no doubt, were reported by mathematics programs under the Other Courses category. Furthermore, the enrollment tables that follow have been adjusted to eliminate all specific computer science enrollments that appeared in previous CBMS reports. (For example, see Tables TYE.3 and TYE.4.) This adjustment allows for a more accurate comparison of mathematics program enrollments over time. There are also instances where "na" will be displayed in a table, indicating that similar data was not collected or was not available.

In contrast to previous surveys, CBMS2005 and CBMS2010 include only public two-year colleges. The two-year college data in this report were projected from a stratified random sample of 205 institutions chosen from a sample frame of 1,121 public two-year colleges. Survey forms were returned by 105 colleges (51% of the sample). The return rate for all two-year and four-year institutions in CBMS2010 was 65% (388 of 593). For comparison purposes, the survey return rate for two-year colleges for CBMS2005 was 54% (130 of 241 colleges), 60% (179 of 300 colleges) for CBMS2000, and 65% (163 of 250) for CBMS1995. The two-year rates continue to reflect the broadened professional involvement of two-year college mathematics faculty and the intense follow-up efforts exerted in collecting survey data. For more information on the sampling and projection procedures used in this survey, see Appendix II. A copy of the two-year college survey questionnaire for CBMS2010 may be found in Appendix V.

The Table display code in Chapter 6 is TYE, for "Two-Year Enrollment," since this chapter mostly addresses issues related to enrollment.

The term "permanent full-time" and "temporary full-time" faculty are occasionally used in this chapter. For a detailed explanation these terms, see the introductory notes in Chapter 7.

Highlights of Chapter 6

- The fall 2010 enrollment in mathematics and statistics courses in mathematics programs at public two-year colleges reached an historic high of 2,104,751 students. This total includes 80,805 dually enrolled students. See Table S.1 in Chapter 1, Table SP.18 in Chapter 2, and Table TYE.2 in this chapter.
- The growth in two-year college mathematics enrollment from 2005 to 2010 was 19% (21% when dual enrollment students are included). During the same period, four-year institutions had an enrollment increase in mathematics courses of 26%. The percent increase in total student enrollment in mathematics courses at two-year colleges was smaller than the enrollment increase from 2000 to 2005 (29% vs 34%). See Tables S.1 in Chapter 1, E.2 in Chapter 3, and TYE.1 and the discussion before Table TYE.2 in this chapter.
- From 2005 to 2010, the overall total enrollment increase at public two-year colleges was 11%, compared with an overall enrollment increase at four-year colleges of 13%. For details, see the

discussion before and after Table TYE.1 and Table S.1.

- Dual enrollment, defined in this survey as students enrolling in a course that earns credit in high school and a two-year college, increased 92% from 2005 to 2010 to a total of 80,805 students. See Tables SP.18 and SP.19 in Chapter 2.
- About 57% of the two-year college mathematics and statistics enrollment in fall 2010 was in Precollege (formerly called remedial) courses. This differed by less than one percent of Precollege enrollments in 2000 and 2005. See Table TYE.4.
- The number of students enrolled in Precollege mathematics courses (Arithmetic, Pre-algebra, Elementary and Intermediate Algebra, and Geometry) at two-year colleges increased to a total of 1,149,740 from 2005 to 2010. This represents a 19% increase from 2005 to 2010. The increase from 2000 to 2005 was 26%, and from 1995 to 2000, the increase was 5%. See Table TYE.4.
- The 19% increase in two-year college Precollege enrollments (see Table TYE.4) contrasts with four-year colleges (see Table E.2) in which Precollege enrollments increased 4% between 2005 and 2010.
- Within the cohort of Precollege courses, Arithmetic/ Basic Skills showed a 40% increase in enrollment from 2005 to 2010. This was a significant reverse of the decreasing enrollment trend in Arithmetic between 1990 and 2005. See Table TYE.3.
- The trend of an increasing enrollment in the Precalculus course group (College Algebra, Trigonometry, College Algebra and Trigonometry, Mathematical Modeling, Elementary Functions) continued in 2010. However, the enrollment growth grew only 15% between 2005 and 2010. This was slightly lower than the 17% growth in mathematics enrollment from 2000 to 2005. See Table TYE.4.
- Enrollment in all calculus-level courses showed a 29% increase between 2005 and 2010, compared to a 9% increase between 2000 and 2005. Enrollments in Non-mainstream Calculus I experienced a slight decrease in the same time period. See Table TYE.3.
- Enrollment was up in 2010 for every course type except Geometry, combined College Algebra/ Trigonometry, Non-mainstream Calculus I, Probability, Finite Mathematics, Mathematics for Elementary Teachers, and Business Mathematics. Notable decreases of 29% occurred in Business Mathematics (non-transferable) and 76% in Business Mathematics (transferable). See Table TYE.3.
- Among the usual college-level transferable mathematics and statistics courses, the largest enrollment increases in percentage order were as follows: Mathematics for Liberal Arts (55% increase), Elementary Statistics (21% increase), and College Algebra (12% increase). Enrollments in Mathematics for Elementary School Teachers remained constant. See Table TYE.3.
- From 2005 to 2010, Intermediate Algebra had a small increase of total students (2%) and showed a decrease in the percentage of students enrolled from 20% to 17%. Other courses that had similar decreases in percentage include College Algebra, Non-mainstream Calculus, Finite Mathematics, and Mathematics for Elementary Teachers. See Table TYE.3.
- Fall 2010 saw slight decreases in the percentage of two-year colleges offering selected mathematics courses required for baccalaureate degrees compared to fall 2005, even though enrollments increased. See Tables TYE.6 and TYE.3.
- The average size of classes taught on two-year campuses remained approximately the same in 2010 as it was in 2005 with 24 students, with the exception of Statistics, which increased to 28 students per section. The percentage of sections with a size greater than 30 increased from 21% in 2005 to 23% in 2010 for all mathematics courses. The class size recommended by the American Mathematical Association of Two-Year Colleges (AMATYC) and the Mathematical Association of America (MAA) is 30 or less. See Tables TYE.7 and TYE.8. For comparable four-year data, see Tables E.13 and E.14 in Chapter 3.
- For the first time, CBMS2010 collected information about the section size of distance learning courses. The average section size of distance learning courses ranged between 4-24 students, with the average section size of all courses consisting of 19 students. See Table TYE.8.1.
- Forty-six percent of mathematics class sections were taught by part-time faculty in 2010. This figure is up two points from 2005 and down four points from 2000. The percentage of sections taught by part-time faculty varied significantly by course type, with part-time faculty teaching 58% of Precollege courses and 11% of mainstream calculus courses. See Table TYE.9.
- Part-time faculty (including those paid by third parties such as school districts) numbered 25,776 and constituted about 70% of the total number of faculty in mathematics programs at public two-year colleges in 2010. Information on faculty size is given in Table TYF.1 in Chapter 7.
- The percent of total enrollment in distance learning courses at two-year colleges almost doubled from 2005 to 2010, increasing from 5% to 9% with a total of 187,523 students. The courses with the largest distance learning enrollment were Elementary

Algebra (37,371 students), College Algebra (31,964 students), Intermediate Algebra (24,544 students), and Elementary Statistics (23,363 students). See Table TYE.12.

- Distance learning courses with the largest percentage of students enrolled in distance learning sections compared to total enrollment in the course were: Mathematics for Elementary School Teachers I and II (17% and 22%, respectively), Elementary Statistics (17%), Math for Liberal Arts (17%), and Business Math (20%). Courses with enrollment in distance learning less than 2% were Geometry (0%), Mainstream Calculus II (1%), Mainstream Calculus III (0.3%), and Non-mainstream Calculus II (0%). See Table TYE.12.
- Precollege distance learning enrollments accounted for 46% of total distance-learning course enrollments. The number of students in Precollege distance learning courses increased 135% from 2005 to 2010, from 37,036 students to 87,073 students. Similar increases, more than doubling the numbers of distance learning students, were experienced in Precalculus courses (College Algebra, Trigonometry, College Algebra and Trigonometry, Mathematical Modeling, Elementary Functions) and Elementary Statistics. See Tables TYE.12 in this chapter and E.4 in Chapter 3. A discussion about the use of distance learning by mathematics departments is included in Chapter 2 before Table SP.10.
- More than ninety percent (90%) of two-year college mathematics programs offered diagnostic or placement testing, with 100% of those colleges requiring placement tests of first-time enrollees. See Table TYE.13.
- Opportunities offered to students included honors sections, mathematics clubs and contests, programs to encourage women and minorities in mathematical studies, undergraduate student research and independent studies in mathematics. These are described in Table TYE.13 in this chapter and in Table SP.14 in Chapter 2.
- The collection of Precollege (remedial) courses taught "outside" the mathematics program (e.g., in developmental studies divisions) showed a 24% decrease in 2010. These "outside" mathematics enrollments, offered at 29% of colleges, are not included in Table TYE. 2. See the discussion before Tables TYE.3 and TYE.5 and especially the discussion before Tables TYE.15, TYE.16, and TYE.17.

Enrollment, Class Size, and Course Offerings In Mathematics Programs

Number of two-year-college students

About 6,870,000 students were enrolled in public two-year colleges in fall 2010. This estimate is based on a mid-range overall 2010 enrollment projection for public two-year colleges by the National Center for Educational Statistics (NCES). Enrollment in two-year colleges in fall 2010 constituted about 42% of the total undergraduate enrollment in the United States, a two percent drop compared with 2005. See Table S.1 in Chapter 1.

Enrollment trends in mathematics programs

Enrollment in mathematics and statistics courses in mathematics programs at public two-year colleges was 2,104,751 students in 2010, an increase of 21% since 2005.

TABLE TYE.1 Total institutional enrollment (in thousands) and percentage of part-time enrollments in two-year colleges in fall for 1975 through 2005 and projected enrollments for fall 2010[1].

	1975	1980	1985	1990	1995	2000	2005	2010
Public + Private								
Number of students	3,970	4,526	4,531	5,240	5,493	5,948	6,488	7,201
Percentage part-time	56	61	63	64	64	63	59	59
Public only								
Number of students					5,278	5,697	6,184	6,870
Percentage part-time					65	65	61	61

[1]Data for 1995, 2000, and 2005, and projections for 2010 are derived from Tables 24, 26, and 27 of the NCES publication "*Projections of Educational Statistics to 2019*" at http://nces.ed.gov/programs/projections/projections2019/tables.asp.

This total includes dual-enrollment students, high school students who took courses taught either in high school or a two-year college campus and received course credit at both the high school and at the two-year college. In comparison to 2005, 2010 saw an increase of 21% in mathematics and science enrollment and represents steady increases during the last decade. The 2000 and earlier entries in Table TYE.2 include private two-year college enrollments. NCES data indicated over 95% of overall two-year college enrollment in 2010 was at public institutions. See Tables TYE.1 and TYE.2 in this chapter and Table SP.18 in Chapter 2.

The 21% enrollment increase in mathematics and statistics courses from 2005 to 2010 mentioned above was almost double the 11% overall enrollment increase at public two-year colleges in the same period. The percentage is based on a mid-range NCES overall enrollment projection of 6,870,000 full-time students at public two-year colleges in 2010. The overall enrollment increase is reported in Table S.1 in Chapter 1 and in Table TYE.1.

Dual-enrollment students in mathematics, numbering 80,805, were one reason for the mathematics program growth in 2010, accounting for about 21% of the growth. When these students are excluded, mathematics programs at public two-year colleges still had an historically high enrollment of 2,023,946. Without dual enrollments, the increase in mathematics enrollments from 2005 to 2010 was 19%. See Table TYE.2, Table S.1 in Chapter 1, and Table SP.18 in Chapter 2.

Two-year college mathematics growth from 2005 to 2010 can be contrasted with the pattern in the nation's four-year colleges and universities. Between 2005 and 2010, mathematics enrollments at two-year colleges increased 21%, while mathematics enrollments increased 27% at four-year colleges and universities. See Table S.1 in Chapter 1.

In addition to the tables that follow, the reader should consult Chapter 1 of the current report. Chapter 1 contains a detailed analysis of mathematics department enrollments at both two-year and four-year colleges over the time period 1995 to 2010 and also contains additional enrollment comparisons between two-year and four-year colleges.

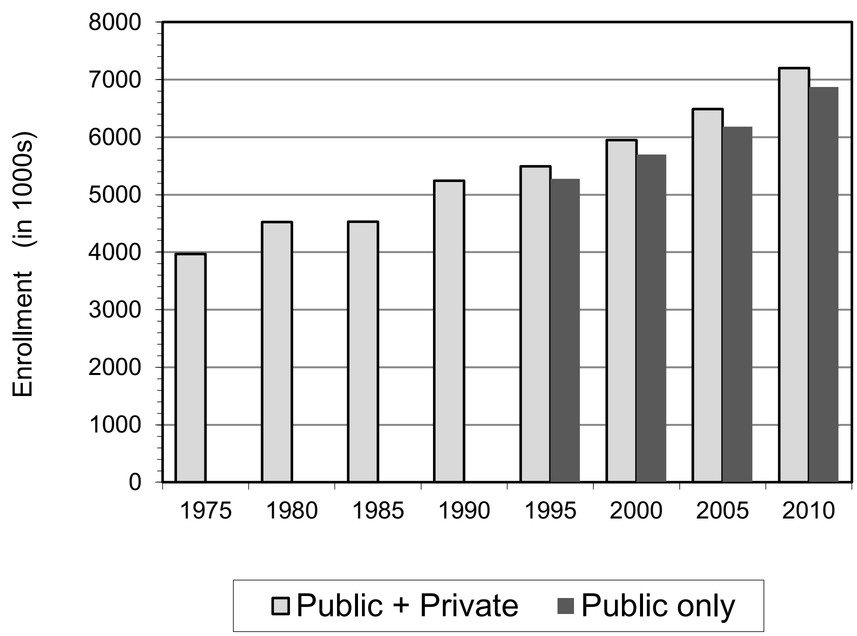

FIGURE TYE.1.1 Total enrollments (all disciplines) in public & private two-year colleges in fall 1975 through fall 2010 and in public-only two-year colleges in fall 1995 through fall 2010.

TABLE TYE.2 Enrollments in mathematics and statistics (no computer science) courses in mathematics programs at two-year colleges in fall 1980, 1985, 1990, 1995, 2000, 2005, and 2010.

	1980	1985	1990	1995	2000	2005 [1]	2010 [1]
Mathematics & Statistics enrollments in TYCs	953,000	936,000	1,295,000	1,456,000	1,347,000	1,739,000	2,105,000

[1] Data for 2005 and 2010 include only public two-year colleges and include 81,000 dual enrollments from Table SP.16.

Note: Data for 1990, 1995, and 2000 in Table TYE.2 differ from corresponding data in Table S.1 of Chapter 1 because the totals in TYE.2 do not include any computer science courses, while the totals in Table S.1 do.

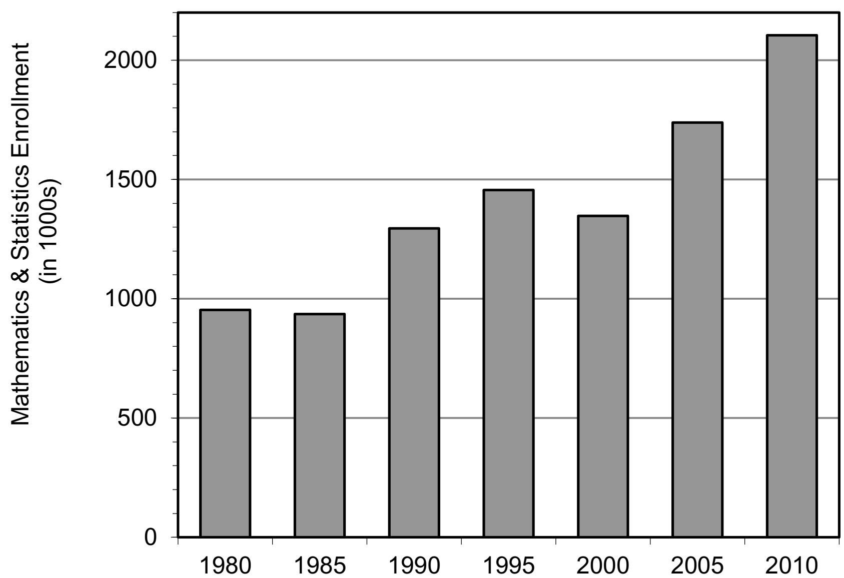

FIGURE TYE.2.1 Enrollments in mathematics and statistics courses (no computer science) in mathematics programs in two-year colleges in fall 1980, 1985, 1990, 1995, 2000, 2005, and 2010. (Data for 2005 and 2010 include only public two-year colleges and include dual enrollments from Table SP.16.)

Enrollment trends in course groups and in specific courses

Table TYE.3 lists enrollment in individual courses. Similar to the five-year period 2000-2005, 22 of the 28 courses surveyed remained level or increased in enrollment between 2005 and 2010. Course enrollment percentage increase of greater than the overall two-year college mathematics enrollment increase of 21% occurred in twelve courses from 2005 to 2010:

Course Number	Course	Percentage
1	Arithmetic and Basic Mathematics	40%
2	Pre-algebra	65%
7	Trigonometry	26%
9	Introduction to Mathematical Modeling	156%
11	Mainstream Calculus I	28%
12	Mainstream Calculus II	55%
13	Mainstream Calculus III	40%
15	Non-mainstream Calculus II	72%
16	Differential Equations	49%
17	Linear Algebra	60%
19	Statistics	21%
22	Mathematics for Liberal Arts	55%

In reviewing this list of percentage increases from 2005 to 2010, one also needs to take into consideration the actual number of students enrolled. Table TYE.3 lists actual enrollments in mathematics courses. For instance, a 156% increase in Mathematical Modeling represented an increase of 11,000 students from 2005-2010. A 65% increase in Pre-algebra enrollment represented an increase of 89,000 students from 2005-2010.

Course enrollment percentage increase less than the overall two-year college mathematics enrollment increase of 21% occurred in twelve courses from 2005 to 2010. Courses that experienced larger decreases in enrollment were:

Course Number	Course	Percentage
5	Geometry	-14%
8	Combined College Algebra/Trigonometry	-25%
20	Probability	-58%
26	Business Mathematics (not transferable)	-29%
27	Business Mathematics (Transferable)	-76%
29	Technical Mathematics (calculus-based)	-33%

Again, percentages can be misleading. A 58% decrease in Probability enrollment represented a change of 4,000 students. An 18% decrease for Finite Mathematics also represented a change of 4,000 students.

In fall 2010, over 1,150,000 students in Precollege courses (Arithmetic, Pre-algebra, Elementary and Intermediate Algebra, and Geometry) comprised over half (57%) of mathematics program enrollment. This percentage has been essentially stable at 57% since 1990. See Table TYE.4.

Precollege enrollment has varied over time as follows: down by 5% from 1995 to 2000, up 26% from 2000 to 2005, and up 19% from 2005 to 2010. These swings in the number of Precollege enrollments have paralleled the rises and falls in the total mathematics program enrollment at two-year colleges during these years: down 7% from 1995 to 2000, up 29% from 2000 to 2005, and up 16% from 2005 to 2010. These percentages are calculated from Table TYE.4, which does not include the 80,805 students in dual-enrollment courses.

Within the Precollege courses, special note is appropriate regarding the increases in Arithmetic and Basic Mathematics, up 40% from 2005, and Pre-algebra, up 65% from 2005. These are large increases in comparison with increases of 13% in Elementary Algebra and 2% in Intermediate Algebra. See Table TYE.3.

About one-third of two-year colleges responding to the survey conducted part of their Precollege (remedial) mathematics program outside of the mathematics program in an alternate structure like a developmental studies division or learning laboratory. This accounted for 152,000 students. These enrollments are not included in Tables TYE.3 and TYE.4. For more information on these "outside" Precollege courses, see the discussion for Tables TYE.15 and TYE.16 later in this chapter.

Precalculus level courses (College Algebra, Trigonometry, College Algebra & Trigonometry, Introduction to Mathematical Modeling, Precalculus) accounted for 18% of 2010 enrollment, one percentage point down from enrollment reported in 2005. Precalculus courses, together with Precollege courses, accounted for 75% of mathematics and statistics enrollment at public two-year colleges in fall 2010. See Table TYE.4.

Calculus-level courses slightly reversed a ten-year decline in which they progressively accounted for smaller proportions of the overall mathematics program enrollment. Table TYE.3 displays a 28% increase in Mainstream Calculus I enrollment, 55% in Calculus II, and 40% in Calculus III. This is contrasted with a decrease of 3% in Non-mainstream Calculus I.

In reading the enrollment tables, the reader is reminded that Mainstream Calculus consists of those calculus courses that lead to more advanced mathematics courses and usually is required of majors in mathematics, the physical sciences, and engineering. Non-mainstream Calculus includes the calculus courses most often taught for biology, behavioral science, and business majors. Additionally, refer to the comments at the start of this chapter about adjustments made in the tables that have not included computer science enrollments since CBMS2000. Additional enrollment data and analysis can also be found in Chapter 1.

It should be noted that the 7% calculus enrollment in TYE.4 for 2010 includes all Calculus listed in course numbers 11-16 in TYE.3 (mainstream and non-mainstream) and represents a one percentage point increase from 2005. The total enrollment in Non-mainstream Calculus I and II remained constant between 2005 and 2010 and represented 17% of all calculus enrollments.

Table TYE.3 reports enrollment in individual mathematics courses. Table TYE.4 reports enrollment for categories of courses. Table TYE.4 is constructed from Table TYE.3 and reports headcounts and percentages from 1990 through 2010 for the following course groupings: Precollege, Precalculus, Calculus, and Statistics. Each category consists of five or more specific courses from Table TYE.3. Percentages in Table TYE.4 will differ slightly from the corresponding percentages in the CBMS2000 report because of the

TABLE TYE.3 Enrollment in thousands in mathematics and statistics courses (not including dual enrollments) in mathematics programs at two-year colleges in fall 1990, 1995, 2000, 2005, and 2010.

Course Number	Type of course	1995	2000	2005	2010
	Precollege level				
1	Arithmetic & Basic Mathematics	134	122	104	146
2	Pre-algebra	91	87	137	226
3	Elementary Algebra (High School level)	304	292	380	428
4	Intermediate Algebra (High School level)	263	255	336	344
5	Geometry (High School level)	7	7	7	6
	Precalculus level				
6	College Algebra (above Intermediate Algebra)	186	173	206	230
7	Trigonometry	43	30	36	45
8	College Algebra & Trigonometry (combined)	17	16	14	11
9	Introduction to Mathematical Modeling	na	7	7	18
10	Precalculus/Elem Functions/Analytic Geometry	50	48	58	64
	Calculus level[1]				
11	Mainstream Calculus I	58	53	51	65
12	Mainstream Calculus II	23	20	19	29
13	Mainstream Calculus III	14	11	11	15
14	Non-mainstream Calculus I	26	16	21	20
15	Non-mainstream Calculus II	1	1	1	2
16	Differential Equations	6	5	4	6
	Other mathematics courses				
17	Linear Algebra	5	3	3	5
18	Discrete Mathematics	3	3	2	2
19	Elementary Statistics (with or w/o Probability)	69	71	111	134
20	Probability (with or w/o Statistics)	3	3	7	3
21	Finite Mathematics	24	19	22	18
22	Mathematics for Liberal Arts	38	43	59	91
23	Mathematics for Elementary School Teachers I [2]	16	18	29	21
24	Mathematics for Elementary School Teachers II [3]	na	na	na	8
25	Other Mathematics Courses for Teacher Preparation [3]	na	na	na	1
26	Business Mathematics (not transferable)	28	14	22	16
27	Business Mathematics (transferable)	11	19	17	4
28	Technical Math (non-calculus-based)	17	13	16	17
29	Technical Math (calculus-based)	2	2	1	1
30	Other Mathematics Courses (not transferable) [4]	0	14	28	33
31	Other Mathematics Courses (transferable) [3]	na	na	na	14
	Total all Two-year College math courses	1425	1347	1696	2024

Note: 0 means fewer than 500 enrollments and na means not available. Round-off may make column sums seem inaccurate.

[1] Mainstream calculus is for mathematics, physics, science & engineering. Non-mainstream calculus is for biological, social, and management sciences.

[2] In 2005 and earlier surveys there was a single course listed as *Mathematics for Elementary School Teachers* .

[3] This course was not listed in 2005 and earlier surveys.

[4] In 2005 and earlier surveys there was a single course listed as *Other Mathematics Courses* .

TABLE TYE.4 Enrollment in 1000s (not including dual enrollments) and percentages of total enrollment in mathematics and statistics courses by type of course in mathematics programs at two-year colleges in fall 1990, 1995, 2000, 2005, and 2010.

Course numbers [1]	Type of course	1990	1995	2000	2005	2010
1-5	Precollege Level	724 (57%)	800 (56%)	763 (57%)	964 (57%)	1150 (57%)
6-10	Precalculus Level	245 (19%)	295 (21%)	274 (20%)	321 (19%)	368 (18%)
11-16	Calculus Level	128 (10%)	129 (9%)	106 (8%)	107 (6%)	138 (7%)
19-20	Statistics, Probability	54 (4%)	72 (5%)	74 (5%)	118 (7%)	137 (7%)
17-18 & 21-31	Remaining Courses	121 (10%)	130 (9%)	130 (10%)	186 (11%)	231 (11%)
1-31	Total, all courses	1272 (100%)	1426 (100%)	1347 (100%)	1696 (100%)	2024 (100%)

[1] For names of specific courses see Table TYE.3.

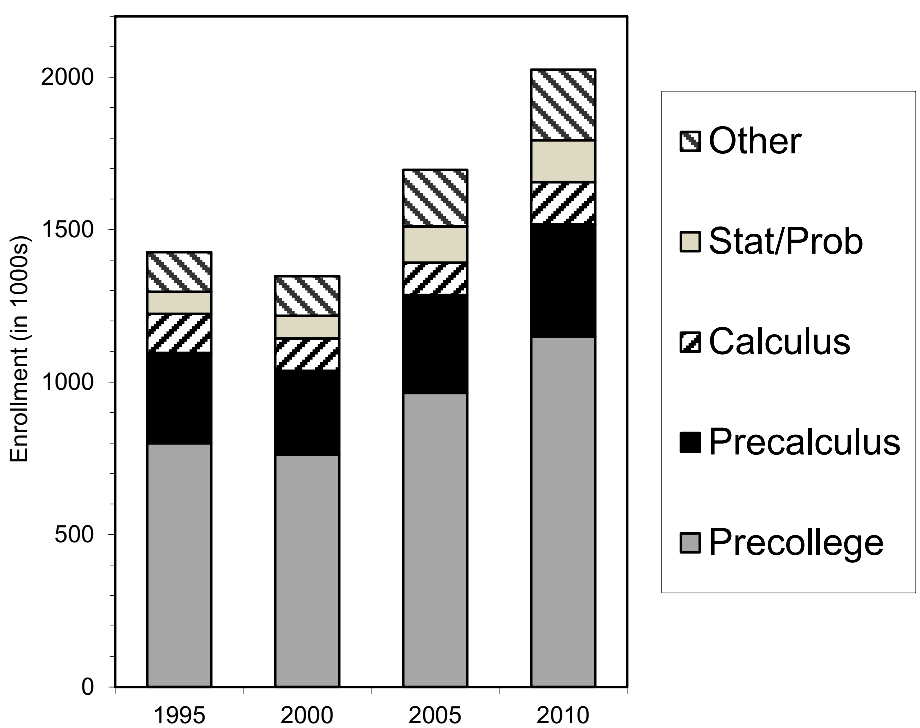

FIGURE TYE.4.1 Enrollment in 1000s (not including dual enrollments) in mathematics and statistics courses by type of course in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

computer science enrollment adjustment discussed in the introduction to this chapter.

Summarizing the enrollment trends in mathematics course categories (see Table TYE.4), the upward trend in actual enrollments from fall 2000 to fall 2005 continued from fall 2005 to fall 2010 with an increase in every category:

- Precollege courses enrolled 186,000 more students in 2010 than in 2005, representing a 19% change.
- Precalculus courses enrolled 47,000 more students in 2010 than in 2005, representing a 15% change.
- Mainstream and Non-mainstream Calculus enrolled 31,000 more students in 2010 than in 2005, representing a 29% change.
- Elementary Statistics and Probability enrolled 19,000 more students in 2010 than in 2005, representing a 16% change.
- Of special note is the 24% increase in the "Remaining" category of 45,000 students, which included Linear Algebra, Discrete Mathematics, Probability, Finite Mathematics, Mathematics for Elementary School Teachers, and Business and Technical Mathematics. Enrollment in the "Remaining" courses varied greatly, including a large increase of 55% in Mathematics for Liberal Arts.

Trends in availability of courses in mathematics programs

Tables TYE.5 and TYE.6 should be considered together; they represent the availability of fall 2005 and 2010 course offerings. Past CBMS surveys assessed the availability of courses throughout the academic year. CBMS2010 limited the questions to fall offerings and Tables TYE.5 and TYE.6 now reflect only fall offerings for both 2005 and 2010.

In considering the availability of courses, the reader should also note that 29% of two-year colleges in fall 2010 reported that some or all of the Precollege (Arithmetic, Elementary Algebra, and Intermediate Algebra) mathematics courses at the college were organized separately from the mathematics department. This was down slightly from the 31% reported in 2005 and the same as in 2000 and 1995. See Table TYE.16. These "outside" courses are not included below in Tables TYE.5 and TYE.6 in reporting the availability of particular courses. The "outside" enrollment headcount is estimated in Tables TYE.15 and TYE.16 and also includes Business Mathematics, Statistics and Probability, and Technical Mathematics. Also see the last highlight bullet at the start of this chapter.

Table TYE.5 reports that the percentage of two-year college mathematics programs offering a separately titled Arithmetic/Basic Mathematics course in 2010 was 50%, following a steep decline from 70% in 1995, 56% in 2000, and 48% in 2005. From 2005 to 2010, the percentage of mathematics programs offering a Pre-algebra course, which generally included arithmetic skills, rose three percentage points to 49%. Table TYE.3 reports that enrollment in Pre-algebra courses rose 65%. See Table TYE.3.

Intermediate Algebra, which is roughly equivalent to the second year of high school algebra, was offered in 79% of colleges in fall 2010, down slightly since 2005. Historically, Intermediate Algebra has been the bridge between a developmental studies division and a mathematics program. Within a mathematics program, Intermediate Algebra often is the preparatory course for transferable college-credit mathematics.

The availability of Elementary Algebra within mathematics programs increased slightly in 2010 to 82% from 80% in 2005. The discussion about mathematics courses taught "outside" the mathematics program is also relevant here. Table TYE.16 reported that almost one-third (29%) of two-year colleges offer precollege courses outside of the mathematics department with 13% of Elementary Algebra courses taught outside the mathematics program and (7%) of all Intermediate Algebra courses taught in other departments or divisions.

CBMS2010 reported a sharp decrease from 19% in fall 2005 to 7% in fall 2010 in the percentage of two-year colleges offering high school level Geometry courses (Table TYE.5), with the overall geometry enrollment decreasing by 1000 students (Table TYE.3).

Data for courses directly preparatory for calculus are also presented in Table TYE.5. In fall 2010, the percentage of colleges offering a separate College Algebra course decreased by two points to 76%. The percentage of colleges offering a separate Trigonometry course was up 4 points to 55%. The combined course College Algebra/Trigonometry experienced a 5-point drop to 12% of colleges offering the course. Precalculus/Elementary Functions experienced a one percentage point increase in availability from 2005 to 2010 to 53%.

Comparing fall 2005 to fall 2010, the percentage of colleges offering the first semester of Mainstream Calculus fell three points to 79%, although total enrollment increased 27% (Tables TYE.5 and TYE.3). The availability of Mainstream Calculus II was up four points to 61%.

Introductory Mathematical Modeling was first surveyed in 2000. In that year, 12% of colleges reported offering the course. In fall 2005, this percentage had dropped to 5%. In 2010, while 9% of colleges reported offering the course, the actual total enrollment of 18,000 represented a 157% enrollment increase.

The CBMS1995 survey noted that many students at two-year colleges could not complete lower-division mathematics requirements in certain majors because essential courses such as Linear Algebra, Mathematics for Liberal Arts, and Mathematics for Elementary School Teachers were offered at fewer than half of two-year college mathematics programs, even over a two-year window. Using the two-year window, CBMS2000 noted an important increase in availability for all three of these baccalaureate-essential courses. In 2005, the availability of all three jumped again.

CBMS2010 reports offerings only in the fall term for 2005 and 2010. Comparing fall 2010 to fall 2005 course offerings, the percentage of colleges offering Linear Algebra remained constant, and Mathematics

TABLE TYE.5 Percentage of two-year college mathematics programs teaching selected mathematics courses in fall 2005 and in fall 2010.

Course number	Type of course	Fall 2005	Fall 2010
1	Arithmetic & Basic Mathematics	48	50
2	Pre-algebra	46	49
3	Elementary Algebra (High School level)	80	82
4	Intermediate Algebra (High School level)	88	79
5	Geometry (High School level)	19	7
6	College Algebra (above Intermediate Algebra)	78	76
7	Trigonometry	51	55
8	College Algebra & Trigonometry (combined)	17	12
9	Introduction to Mathematical Modeling	5	9
10	Precalculus/ Elementary Functions/ Analytic Geometry	52	53
11	Mainstream Calculus I	82	79
12	Mainstream Calculus II	57	61
13	Mainstream Calculus III	52	56
14	Non-mainstream Calculus I	36	25
15	Non-mainstream Calculus II	3	5
16	Differential Equations	25	21
17	Linear Algebra	19	19
18	Discrete Mathematics	12	11
19	Elementary Statistics (with or w/o Probability)	78	73
20	Probability (with or w/o Statistics)	7	5
21	Finite Mathematics	28	27
22	Mathematics for Liberal Arts	56	44
23	Mathematics for Elementary School Teachers I [1]	59	55
24	Mathematics for Elementary School Teachers II [2]	na	27
25	Other Mathematics Courses for Teacher Preparation [2]	na	2
26	Business Mathematics (not transferable)	19	20
27	Business Mathematics (transferable)	15	6
28	Technical Mathematics (non-calculus-based)	35	26
29	Technical Mathematics (calculus-based)	5	3
30	Other Mathematics Courses (not transferable) [3]	26	19
31	Other Mathematics Courses (transferable) [2]	na	18

[1] In 2005 there was a single course listed as *Mathematics for Elementary School Teachers;* the enrollment for that course is listed here.

[2] This course was not listed in 2005 survey.

[3] In 2005 there was a single course listed as *Other Mathematics Courses;* the enrollment for that course is listed here.

TABLE TYE.6 Percentage of two-year college mathematics programs teaching selected mathematics courses in the fall terms of 1995, 2000, 2005, and 2010.

		Percentage of two-year colleges teaching course			
Course number	Type of course	1995	2000	2005	2010
11	Mainstream Calculus I	83	94	82	79
16	Differential Equations	53	59	25	21
17	Linear Algebra	30	39	19	19
18	Discrete Mathematics	12	19	12	11
19	Elementary Statistics (with or w/o Probability)	80	83	78	73
21	Finite Mathematics	31	32	28	27
22	Mathematics for Liberal Arts	46	50	56	44
23	Mathematics for Elementary School Teachers I [1]	43	49	59	55
28	Technical Mathematics (non-calculus-based)	33	36	35	26
29	Technical Mathematics (calculus-based)	11	9	5	3

[1] In 2005 and earlier there was a single course listed as *Mathematics for Elementary School Teachers;* the enrollment for that course is listed here.

for Elementary School Teachers I decreased 4 percentage points. Mathematics for Liberal Arts shows a 12% decrease in departments offering the course in the fall semester while experiencing a 55% increase in student enrollment between 2005 and 2010. See Table TYE.5.

Availability of other courses important to baccalaureate degrees in science, technology, engineering, mathematics, and computer science—such as Differential Equations, Discrete Mathematics, Elementary Statistics, and Finite Mathematics—had small losses in 2010. See Table TYE.6.

The overall 2010 survey data reflect the continued significant role that two-year colleges play in the mathematics preparation of future teachers and majors in STEM courses and degrees in what the National Science Foundation calls STEM degrees (science, technology, engineering, and mathematics).

Trends in average section size

The downward trend in the average number of students per class section in two-year college mathematics courses exhibited in 1990 through 2005 shifted slightly upward in 2010. The average class size in fall 2010 was 24 students, compared with 23 in 2005 and 24.8 in 2000. The Precollege and Precalculus course categories had average class sizes of 24 and 26 students respectively in 2010. Calculus classes (Mainstream and Non-mainstream) were about 3 persons below the overall average (21), while Statistics and Probability averaged 4 students above the average (28). See Table TYE.7.

In 2005, the lower cut-off of 30 students per class was chosen to make data for two-year colleges directly comparable to that collected for four-year institutions and to coincide with the recommendation from the Mathematical Association of America (MAA) and endorsement by the American Mathematical Association of Two-Year Colleges (AMATYC) that undergraduate class size not exceed 30 students. In fall 2010, 77% of all class sections in two-year colleges met the goal of the two professional societies. At four-year colleges and universities, the average class size for freshman-/sophomore-level courses through calculus ranged from 20 - 31 students, depending on course type. At PhD-granting institutions, these numbers ranged from 35 - 43 students. See Table E.13 in Chapter 3 for four-year institutional data.

Table TYE.7 reports that 23% of all class sections in fall 2010 had size greater than 30, up two points from 21% in 2005. There is no comparable figure for 2000 since in CBMS2000 the comparison size for two-year colleges was 35 students per class section. In 2000, 10% of class sections were over 35 students.

For a closer examination of individual course average section sizes in 2010, see Table TYE.8. One example is the average class size in Mathematics for Elementary Teachers was 19 students, up 4 students from 2005 (see CBMS2005 for 2005 data). As one would expect, except for some specialized courses, the

TABLE TYE.7 Average on-campus section size by type of course in mathematics programs at two-year colleges in fall 2000, 2005, and 2010. Also percentage of sections with enrollment above 30 in fall 2005 and 2010.

			2005		2010	
Course numbers [1]	Type of course	2000 average section size	average section size	Percentage of sections with size > 30	average section size	Percentage of sections with size > 30
1-5	Precollege Level	24.5	23.9	21%	24.0	20%
6-10	Precalculus Level	24.8	23.6	23%	26.0	34%
11-16	Calculus Level	20.8	20.0	16%	21.0	25%
19-20	Elem. Statistics, Probability	25.2	25.9	33%	28.0	38%
1-31	Total, all courses	24.8 [2]	23.0	21%	24.0	23%

[1] For names of specific courses see Table TYE.3.

[2] The average section size of 23.7 reported in CBMS2000 included computer science courses taught in mathematics programs.

TABLE TYE.7.1 Average distance learning section size by type of course in mathematics programs at public two-year colleges in fall 2010. Also percentage of sections with enrollment above 30 in fall 2010.

Course number [1]	Type of course	2010 average section size	Percentage of 2010 sections with size > 30
1-5	Precollege Level	23.0	23%
6-10	Precalculus Level	22.0	12%
11-16	Calculus Level	15.0	0%
19-20	Statistics, Probability	24.0	15%
1-31	Total, all courses	22.0	10%

[1] For names of specific courses see Table TYE.3.

smallest class sizes were among advanced courses at the two-year college such as Mainstream Calculus III and Discrete Mathematics.

Given the increasing enrollments in distance learning courses, CBMS2010 collected data on the average section size of distance learning classes. As reported in Tables TYE 7.1 and 8.1, average section sizes for all distance learning courses ranged from 4 to 24 students. Section sizes in Precollege courses (course numbers 1-5) ranged from 22-24 students. Precalculus (course numbers 6-10) average section sizes ranged from 17-24 students. Mainstream Calculus and Non-mainstream Calculus section sizes ranged from 4-19 students. Comparing the section sizes of distance learning by course category to face-to-face section sizes, distance learning section size was less than the face-to-face in all categories (see Tables TYE 7.1 and TYE 8.1).

Trends in the use of part-time faculty

In fall 2010, there were more than twice as many part-time faculty as full-time faculty at two-year colleges (see Table TYF.1 in Chapter 7). However, this statement requires some explanation. The relevant issue, as the faculty data in Table TYF.1 reflected, is who is included in the various categories. When faculty of every sort are included, such as part-time faculty paid by third parties and also temporary full-time faculty, part-time faculty in fall 2010 made up about 70% of the total faculty. The comparable figure in 2005 was 68%. If the 2,323 third-party-payee part-time faculty members are excluded, 68% of the faculty

TABLE TYE.8 Average on-campus section size for public two-year college mathematics program courses in fall 2010.

Course number	Type of course	Average section size	Course number	Type of course	Average section size
1	Arithmetic & Basic Mathematics	24	17	Linear Algebra	20
2	Pre-algebra	21	18	Discrete Mathematics	18
3	Elementary Algebra (High School level)	24	19	Elementary Statistics (with or w/o Probability)	28
4	Intermediate Algebra (High School level)	25	20	Probability (with or w/o Statistics)	22
5	Geometry (High School level)	26	21	Finite Mathematics	23
6	College Algebra (above Intermediate Algebra)	26	22	Mathematics for Liberal Arts	27
7	Trigonometry	27	23	Mathematics for Elementary School Teachers I	19
8	College Algebra & Trigonometry (combined)	22	24	Mathematics for Elementary School Teachers II	17
9	Introduction to Mathematical Modeling	28	25	Other Mathematics Courses for Teacher Preparation	23
10	Precalculus/Elem Functions/Analytic Geometry	26	26	Business Math (not transferable)	22
11	Mainstream Calculus I	20	27	Business Math (transferable)	27
12	Mainstream Calculus II	24	28	Technical Math (non-calculus-based)	21
13	Mainstream Calculus III	20	29	Technical Math (calculus-based)	22
14	Non-mainstream Calculus I	21	30	Other Mathematics Courses (not transferable)	21
15	Non-mainstream Calculus II	27	31	Other Mathematics Courses (transferable)	23
16	Differential Equations	23			

had part-time status in fall 2010. The comparable figure for 2005 was 65%.

Though making up about 70% of total faculty by headcount, part-time faculty taught less than half (46%) of mathematics program class sections in fall 2010, up two percentage points from 2005. See Table TYE.9. For historical reference, in fall 2000, 46% of class sections were taught by part-time faculty. In fall 1995, this figure was 38%.

Concerning the important instructional issue of which types of courses are taught most often by part-time faculty, the pattern in fall 2010 continued from fall 2005. Once again in fall 2010, it was more likely that a part-time faculty member was teaching a course below calculus than a calculus course. In 2010, 58% of all Precollege courses were taught by part-time faculty, up two points compared with 2005, compared to 11% of Mainstream Calculus courses (down one point) and 27% of Non-mainstream Calculus (down one point). Table TYE.9 contains the relevant percentages.

Instructional Practices in Mathematics Programs

CBMS2005 presented the percentage of class sections in mathematics courses at public two-year colleges that employed the instructional practices of using graphic calculators, writing assignments, computer assignments, group projects, online resource systems, and standard lecture methods (Table TYE.10). At that time, the predominant instructional method was the standard lecture format, with percentage of use in an individual course ranging from 93% in Differential Equations and 81% in Mainstream Calculus I to 74% in each of College Algebra and Elementary Algebra to 64% in Arithmetic. Exceptions to the predominance of the lecture method were Mathematics for Elementary School Teachers and certain business mathematics

TABLE TYE.8.1 Average distance learning section size for public two-year college mathematics program courses in fall 2010.

Course number	Type of course	Average section size	Course number	Type of course	Average section size
1	Arithmetic & Basic Mathematics	22	17	Linear Algebra	20
2	Pre-algebra	23	18	Discrete Mathematics	15
3	Elementary Algebra (High School level)	24	19	Elementary Statistics (with or w/o Probability)	24
4	Intermediate Algebra (High School level)	22	20	Probability (with or w/o Statistics)	11
5	Geometry (High School level)	na	21	Finite Mathematics	20
6	College Algebra (above Intermed. Alg.)	23	22	Mathematics for Liberal Arts	24
7	Trigonometry	24	23	Mathematics for Elementary School Teachers I	19
8	College Algebra & Trigonometry (combined)	23	24	Mathematics for Elementary School Teachers II	18
9	Introduction to Mathematical Modeling	17	25	Other Mathematics Courses for Teacher Preparation	na
10	Precalculus/Elem Functions/Analytic Geometry	20	26	Business Math (not transferable)	24
11	Mainstream Calculus I	15	27	Business Math (transferable)	24
12	Mainstream Calculus II	8	28	Technical Math (non-calculus-based)	17
13	Mainstream Calculus III	4	29	Technical Math (calculus-based)	13
14	Non-mainstream Calculus I	19	30	Other Mathematics Courses (not transferable)	12
15	Non-mainstream Calculus II	na	31	Other Mathematics Courses (transferable)	22
16	Differential Equations	na			

courses. CBMS2000 reported that 78% of all class sections used the lecture method as the dominant instructional practice.

Reflecting the changes in mathematics instruction practices in the last five years, CBMS2010 responders were asked to report on faculty use of computer algebra systems, commercially produced electronic instructional packages, and the standard lecture method. In reviewing Table TYE.10, the reader will note the small number of percentages in some categories and with the number of sections taught in each modality totaling more than 100% for every course. Reasons for the incomplete data may be that the list of practices was not comprehensive enough to capture the different modalities used in 2010 classrooms, that department chairs (or persons completing the survey) did not always know which instructional practice is used by instructors, and/or that it was difficult to collect such data. In addition, it may have been that more than one instructional method was being used and hence the section was not reported in any one of the columns. In spite of the gaps, the writers of this summary felt that the data in the table should be presented as collected.

Regarding the 2010 data collected, the following observations can be made (see Table TYE.10):

- Computer algebra systems were used mainly in College Algebra & Trigonometry (combined), mainstream Calculus III, Differential Equations, and Probability.
- Commercially produced electronic instructional packages were used mainly at the Precollege level, and in College Algebra & Trigonometry (combined) and Probability.

TABLE TYE.9 Number of sections and number and percentage of sections taught by part-time faculty in mathematics programs at public two-year colleges by type of course in fall 2005 and 2010.

		2005			2010		
Course number [1]	Type of course	Number of sections	Number of sections taught by part-time faculty	Percentage of sections taught by part-time faculty	Number of sections	Number of sections taught by part-time faculty	Percentage of sections taught by part-time faculty
1-5	Precollege level	38814	21696	56%	45131	26069	58%
6-10	Precalculus level	12898	3914	30%	12588	3940	31%
11-13	Mainstream Calculus	3973	493	12%	5155	558	11%
14-15	Non-mainstream Calculus	923	254	28%	959	259	27%
16-18	Advanced level	617	58	9%	616	69	11%
19-20	Statistics, Probability	4142	1452	35%	4090	1573	38%
21-27	Service courses	6710	1913	29%	5673	2258	40%
28-29	Technical mathematics	927	339	37%	1533	264	17%
30-31	Other mathematics courses	1193	552	46%	2272	974	43%
1-31	Total, all courses	70197	30671	44%	78018	35965	46%

[1] For names of specific courses see Table TYE.3.

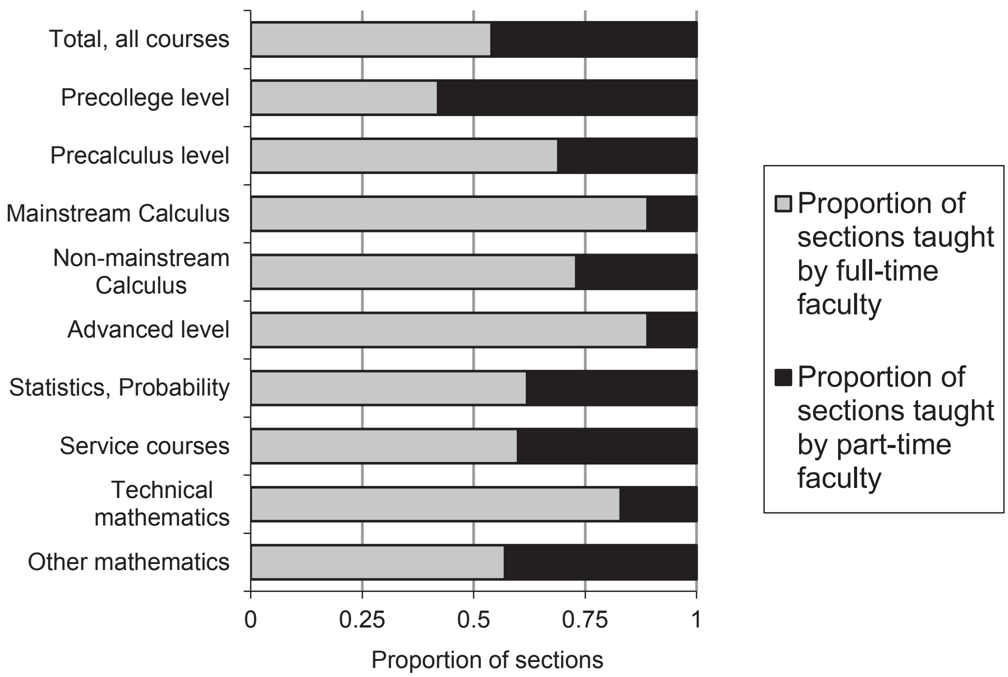

FIGURE TYE.9.1 Proportion of sections of mathematics and statistics courses taught by full-time and by part-time faculty in mathematics programs at public two-year colleges by type of course in fall 2010.

- Lecture method was used in all courses. The range of use by lecture method was:

Course #	Category	% range of use
1-5	Precollege level	31-40%
6-10	Precalculus level	11-34%
11-15	Calculus level	66-85%
19-20	Statistics/Prob	81-100%

Data and analysis on how first-year courses were taught at four-year institutions can be found in Chapter 5 of this report in Tables FY.2 through FY.10. For comparative data about four-year and two-year institutions, see Chapter 1, Tables S.11 through S.13.

Instructional methods in Precollege courses

In 2010, given the national attention on Precollege enrollments and redesigned curricula, survey respondents were asked specific questions about the use

TABLE TYE.10 Percentage of on-campus sections using different instructional methods by course in mathematics programs at public two-year colleges in fall 2010.

		Percentage of sections taught that			
Course Number	Type of course	Use computer algebra system %	Use commercially produced electronic instructional packages %	Are taught mostly by the standard lecture method %	Total number of on-campus sections in fall 2010
1	Arithmetic & Basic Mathematics	8	32	66	5652
2	Pre-algebra	9	40	54	10183
3	Elementary Algebra (High School level)	7	33	76	16236
4	Intermediate Algebra (High School level)	8	31	69	12843
5	Geometry (High School level)	0	0	77	217
6	College Algebra (above Intermed. Algebra)	6	34	79	7628
7	Trigonometry	4	23	91	1540
8	College Algebra & Trigonometry (combined)	12	20	89	413
9	Introduction to Mathematical Modeling	0	11	95	618
10	Precalculus/Elem Functions/Analytic Geometry	2	20	84	2389
11	Mainstream Calculus I	9	12	66	3166
12	Mainstream Calculus II	9	11	85	1223
13	Mainstream Calculus III	20	8	85	766
14	Non-mainstream Calculus I	0	22	72	895
15	Non-mainstream Calculus II	0	0	83	64
16	Differential Equations	14	6	81	266
17	Linear Algebra	8	8	87	239
18	Discrete Mathematics	0	0	77	111
19	Elementary Statistics (with or w/o Probability)	2	19	81	3965
20	Probability (with or w/o Statistics)	15	53	100	126
21	Finite Mathematics	4	26	82	703
22	Mathematics for Liberal Arts	1	12	88	2857
23	Mathematics for Elementary School Teachers I	7	4	71	973
24	Mathematics for Elementary School Teachers II	5	3	80	366
25	Other Mathematics Courses for Teacher Preparation	0	0	86	28
26	Business Math (not transferable)	3	4	68	602
27	Business Math (transferable)	0	20	91	143
28	Technical Math (non-calculus-based)	1	10	28	1203
29	Technical Math (calculus-based)	0	0	3	330
30	Other Mathematics Courses (not transferable)	0	46	87	1488
31	Other Mathematics Courses (transferable)	1	5	54	784

of accelerated and slower-paced Precollege course syllabi, the implementation of learning communities, and summer mathematics boot camps. Table TYE.11 shows a predominance of accelerated and slower-paced sections and summer boot camps in Beginning and Intermediate Algebra, with the percentage of departments using these strategies in these two courses ranging from 22% to 49%. Table TYE.11 also highlights the growth of learning communities where students work together and the Precollege skills of reading, writing, and mathematics are brought together in a unified curricular structure.

The use of both hand-held and computer technology in Precollege mathematics courses is presented in TYE.11.1. When this data is compared to TYE.10 in CBMS2005, the use of graphing calculators in Intermediate Algebra increased from 32% to

TABLE TYE.11 Percentage of mathematics programs at public two-year colleges whose institutions made various options available to students in developmental mathematics in fall 2010.

Course Number	Type of course	Accelerated Sections	Slower-Paced Sections	Learning Communities	Summer Boot Camp	Not applicable (course not offered)
1	Arithmetic & Basic Mathematics	22	23	17	13	34
2	Pre-algebra	35	22	15	8	30
3	Elementary Algebra (High School level)	49	29	16	15	15
4	Intermediate Algebra (High School level)	38	22	10	10	15

TABLE TYE.11.1 Percentage of mathematics programs at public two-year colleges reporting the use of various technologies in specific courses in fall 2010.

			Most sophisticated technology that is required or allowed:					
Course Number	**Type of course**	No Calculator Allowed	Four-Function Calculator	Scientific Calculator	Graphing Calculator	Computer-Based Tools	No Department Policy	Not applicable (course not offered)
1	Arithmetic & Basic Mathematics	43	7	12	1	3	8	26
2	Pre-Algebra	26	10	22	5	6	7	24
3	Elementary Algebra (High School level)	13	8	32	18	6	19	4
4	Intermediate Algebra (High School level)	4	3	23	42	7	17	4

TABLE TYE.11.2 Percentage of mathematics programs reporting status of "College Algebra" at public two-year colleges in fall 2010.

A. Percentage of all departments that offer College Algebra	84
B. Purpose of College Algebra programs is to	
a. Prepare students for Trigonometry, Engineering, or other Calculus	84
b. Prepare students for Business Calculus but not Engineering Calculus	55
c. Strengthen general quantitative literacy	73
d. Provide an option to students taking no further math	68
C. Course content primarily taught through modeling and problem solving	26
D. Department policy either requires or allows:	
a. Scientific calculator	59
b. Graphing calculator	65
c. Calculators with Algebra System	7
E. Use of technology	
a. Instructors and/or students use spreadsheets	20
b. Students use commercial programs	59
c. Students use computer algebra systems	24
d. Students are required to submit homework via an online platform	49
e. Offer web-based resources	47

42% in 2010. In 2010, calculators were not allowed in 43% of Arithmetic courses and 4% of Intermediate Algebra courses. For the first time, the question was asked whether the mathematics department had a departmental policy regarding the use of calculators in Precollege courses. The data suggests a split regarding the use of calculators in Arithmetic compared with Intermediate Algebra courses. There was no departmental policy on the use of technology in 7-8% of Arithmetic and Pre-algebra courses, suggesting policies do exist in 92% of departments, compared with 17-19% of departments with no department policy about the use of calculators in Beginning and Intermediate Algebra.

Instructional methods in College Algebra, Precalculus and Calculus courses

Prior to fall 2010, specific information about instructional practices used in Calculus had been collected. These questions were not repeated in the 2010 two-year college survey. In fall 2005, there were clear patterns among various types of courses regarding the four instructional techniques included in the survey (use of a graphing calculator, inclusion of a writing component, computer assignments, and the use of group projects). For all calculus courses (both mainstream and non-mainstream) and for Precalculus courses, the graphing calculator was used more frequently than any other technique. The percentage of sections using graphing calculators in calculus and Precalculus courses ranged from 74% to 81%, very similar to the range in 2000 of 69% to 83%. Only Non-mainstream Calculus II had a distinctly lower use (40%), and this may well be attributed to its extremely low reported enrollment.

Prior to 2005, use of the above methods was associated closely with adoption of "calculus reform" either by entire departments or by individual faculty members. In light of the somewhat general implementation of many calculus reform practices, the instructional teaching questions about calculus were not asked on the 2010 two-year college survey. Tables TYE.10 in this chapter and S.11 in Chapter 1 report that lecture was the primary instructional strategy in Calculus courses. Calculus data for two-year and four-year institutions can be found in Tables S.11 and S.12 in Chapter 1.

CBMS2010 focused on the national interest in the curricula and instructional practices of the courses titled "College Algebra." Initiatives of AMATYC and the MAA brought faculty together to discuss the broad role of College Algebra in preparing students for Calculus, but also preparing students for non-calculus academic paths. Table TYE.11.2 reports that 84% of responding colleges offer a college algebra course with 68% responding that the course was intended for students who will be taking no further mathematics and 84% responding that the course was intended to prepare students for trigonometry, engineering, or other calculus. Respondents were asked to check all categories that described the purpose of their College Algebra course. The percentages illustrated the overlapping purpose of College Algebra across the country, highlighting the challenges in teaching these courses and demonstrating the need for more national dialogue on the purpose of College Algebra and the structure and content of other courses traditionally preparing students for Calculus.

The use of calculators in College Algebra is prevalent, with up to 65% of departments requiring or allowing them. Of special note is the increasing use of spreadsheets, commercial technological programs, computer algebra systems, homework via an online platform, and other web-based resources.

Distance learning

In 2010, as in 2005, "distance learning" was defined as a course in which the majority of instruction occurs with the instructor and the students separated by time and/or place. The CBMS2005 survey inquired about the number of course sections taught via distance learning. Data about distance learning courses was collected differently in 2010, including information about both course enrollment and number of class sections. This change was motivated by the fact that distance-learning sections are not bound by room-size limits and can vary dramatically depending on local administrative practice. The comments that precede Table E.4 in Chapter 3 discuss the survey questions in CBMS2010 about "distance learning" for both four-year and two-year colleges. Additional discussion and tables about distance learning enrollments and instructional strategies for both two-year and four-year institutions are included in Chapter 2 (Tables SP.10-SP.13).

Looking back over fifteen years, less than 1% of mathematics class sections at two-year colleges were offered via television in 1995 and only 2.5% of sections in 2000 were described as using distance learning. Among high enrollment courses in 2000, College Algebra had 6.7% of sections offered via distance learning and Elementary Statistics had 5.8%.

Using enrollment data, not section counts, the fall 2010 data for two-year colleges (Tables TYE.12 in this chapter and E.4 in Chapter 3) reported that over 9% of all mathematics students enrolled via distance (187,573 students of the total 2,023,946 students), an increase of 4 points from 2005. Comparing 2010 to 2005, two-year colleges had increases in students enrolled in courses via distance learning in most courses.

As stated earlier, given the increasing enrollments in distance-learning courses, CBMS2010 collected data on the average section size of distance-learning classes. As reported in Tables TYE 7.1 and 8.1, average section sizes for all distance-learning courses ranged from 4 to 24 students. Sections sizes in Precollege courses (course numbers 1-5) ranged from 22-24 students. Precalculus (course numbers 6-10) average section sizes ranged from 17-24 students. Mainstream Calculus and Non-mainstream Calculus section sizes ranged from 4-19 students. Comparing the section sizes of distance learning by course category to face-to-face section sizes, distance learning section size was less than the face-to-face in all categories. (Tables TYE.7.1 and TYE.8.1)

CBMS2010 also collected data on characteristics of distance learning courses and programs in two-year colleges (see Table TYE.12.1 and Tables SP.10-SP.13 in Chapter 2). Eighty-eight percent (88%) of mathematics departments reported that the goals of distance learning courses were the same as face-to-face courses, with 96% using the same course outlines for distance learning as face-to-face classes. Instructional materials were a combination of materials created by faculty and commercially produced products, used in 78% of the departments. Twenty-one percent (21%) of the departments require faculty to meet with students a specified number of office hours per week. Exams in distant learning courses were the same as face-to-face courses at 47% of the colleges reporting.

A more detailed discussion about trends in distance learning can be found in Table E.4 in Chapter 3 and in the Chapter 2 discussion preceding Tables SP.10-SP.13. At four-year institutions in fall 2005, there was only one of the course groupings in Table E.4 showing more than 2% of total enrollment in a distance format. In 2010, while the use of distance learning in four-year institutions was less than at two-year colleges, the data showed that almost 4% of Precollege level courses and over 5% of Elementary Statistics enrollments were in distance-learning courses at four-year institutions.

Services Available to Students

Chapter 2 of this report contains a comparison of academic services and other resources available to both four-year college students and to two-year college students in fall 2010. See Tables SP.14 and SP.15 in that chapter.

Placement testing

Table TYE.13 reported that diagnostic or placement/diagnostic testing was available in 90% of two-year colleges. One hundred percent of these colleges made such testing mandatory for first-time students, 98% used this score as part of a mandatory course placement program, and 75% of the colleges responding periodically assess the effectiveness of their placement tests.

Math Clubs, independent study, honors programs, programs for minorities, programs for women, and outreach projects in K-12 schools

Tables TYE.13, SP.14, and SP.15 report specific outside-of-class opportunities for two-year college mathematics students. Notable increases in participation occurred in opportunities for students to participate in various activities: mathematics clubs (31% in 2010 compared to 22% in 2005), lectures/colloquia not part of mathematics clubs (16% in 2010 compared to 6% in 2005), and undergraduate research activities (14% in 2010 compared to 9% in 2005). Participation in mathematics contests was up two points to 41% of colleges. Independent studies in mathematics decreased three points to 36%. Over ten years, honors sections in mathematics programs have gone up and down, from 17% in 1995 to 20% in 2000 to 24% in 2005 and back down to 20% in 2010. Special programs to encourage minorities in mathematics were reported in 15% of two-year colleges in 2005; this percentage dropped to 11% in 2010, matching the 11% reported in 1995.

In 2010, K-12 outreach opportunities increased again, up 7 points from 2005 to 32%. Similarly, opportunities for involvement with K-12 schools increased in four-year colleges, up to 49% from 34% in 2005. Additional discussion about teacher training in two-year colleges appears at the end of this chapter and in Chapter 2 (Tables SP.14, SP.2, and SP.4).

Mathematics labs and tutoring centers faculty advisors and advising, student-faculty interaction

In fall 2005, as noted above, 95% of mathematics programs at two-year colleges reported making available a mathematics lab or tutorial center to students.

The period from 1995 to 2000 witnessed a 50% drop (down 32 percentage points from 65% to 33%) in colleges where mathematics advising to students was provided by members of the mathematics faculty. In 2005 and 2010, this pattern had partly reversed itself with 40% and 42%, respectively, of colleges reporting that students were advised by mathematics faculty (Table TYE.13).

CBMS2010 did not attempt to survey comprehensively the habits of mathematics students related to academic services or the amount of time spent by faculty in these areas. Data of this kind have been collected by other entities. One resource is the Community College Survey of Student Engagement (CCSSE), conducted under the auspices of the Community College Leadership Program at The University of Texas at Austin since 2004. The 2011 CCSSE Survey collected data from 444,000 students at 699 colleges in 48 states and Washington, DC. The survey is not specific to mathematics students, but the items below relate to the CBMS survey questions.

TABLE TYE.12 Percentage of distance-learning enrollments (= distance-learning courses are courses in which the majority of instruction occurs with the instructor and the students separated by time and/or place) among all enrollments (excluding dual enrollments) at public two-year colleges in fall 2005 and 2010, and total enrollments (in 1000s) in those courses.

		2005	2005	2010	2010	2010
Course Number	Type of course	Total Enrollments [4] (1000s)	Percentage Distance Enrollments	Total Enrollments [4] (1000s)	Distance Enrollments (1000s)	Percentage Distance Enrollments
1	Arithmetic & Basic Mathematics	104	4	146	11	7
2	Pre-algebra	137	3	226	14	6
3	Elementary Algebra (High School level)	380	4	428	37	9
4	Intermediate Algebra (High School level)	336	5	344	25	7
5	Geometry (High School level)	7	12	6	0	0
6	College Algebra (above Intermed. Algebra)	206	6	230	32	14
7	Trigonometry	36	4	45	4	10
8	College Algebra & Trigonometry (combined)	14	1	11	1	12
9	Introduction to Mathematical Modeling	7	11	18	1	4
10	Precalculus/ Elementary Functions/ Analytic Geometry	58	4	64	3	5
11	Mainstream Calculus I	51	5	65	2	3
12	Mainstream Calculus II	19	1	29	0	1
13	Mainstream Calculus III	11	2	15	0	0
14	Non-mainstream Calculus I	21	5	20	2	8
15	Non-mainstream Calculus II	1	0	2	0	0
16	Differential Equations	4	0	6	0	2
17	Linear Algebra	3	2	5	0	4
18	Discrete Mathematics	2	2	2	0	12
19	Elementary Statistics (with or w/o Probability)	111	9	134	23	17
20	Probability (with or w/o Statistics)	7	7	3	0	7
21	Finite Mathematics	22	5	18	2	11
22	Math for Liberal Arts	59	8	91	15	17
23	Mathematics for Elementary School Teachers I [1]	29	10	21	2	11
24	Mathematics for Elementary School Teachers II [2]	na	na	8	2	20
25	Other Mathematics Courses for Teacher Preparation [2]	na	na	1	0	0
26	Business Math (not transferable)	13	9	16	3	19
27	Business Math (transferable)	14	11	4	0	7
28	Technical Math (non-calculus)	16	1	17	1	7
29	Technical Math (calculus)	1	0	1	0	37
30	Other Math Courses (not transfer-able) [3]	na	na	33	2	7
31	Other Math Courses (transferable) [2]	na	na	14	3	19
	Total Enrollments	1696		2024	188	

Note: 0% means less than one-half of one percent.

[1] In 2005 there was a single course listed as *Mathematics for Elementary School Teachers;* the enrollment for that course is listed here.

[2] This course was not listed in 2005.

[3] In 2005 there was a single course listed as *Other Mathematics Courses;* the enrollment for that course is listed here.

[4] Does not include dual enrollments.

TABLE TYE.12.1 Percentage of mathematics programs reporting use of distance learning in public two-year colleges.

A. Goals of distance learning generally the same as face-to-face courses	
a. Yes	88
b. No	0
c. Do not have distance learning	12
B. Instructional materials created by:	
a. Faculty	10
b. Commercially produced materials	12
c. Combination of both	78
C. Format of majority of distance learning	
a. Complete online	73
b. Hybrid	22
c. Other	5
D. Requirements of distance learning faculty to meet with students	
a. Never	8
b. For scheduled meetings	6
c. Specified office hours per week	21
d. Not applicable	65
E. How distance learning students take majority of tests	
a. Complete online and unproctored	11
b. At proctored testing site	42
c. Combination of both	47
F. Exams when there are multiple instructors	
a. No common departmental exams	39
b. Common departmental exams for some courses	20
c. Common departmental exams for all courses	23
G. Are some courses in both non-distance and distance learning formats	
a. Yes	97
b. No	3
H. Distance learning practices	
a. Same exams as in face-to-face	47
b. Same outlines as in face-to-face	96
c. Same course projects	49
I. Distance learning instructors evaluated in same way	
a. Yes	78
b. No	22

Related highlights of the 2011 CCSSE Student Survey are listed below:

- Fifty-eight percent (58%) of students use academic advising services *sometimes* or *often*, and 34% *rarely* or *never* use them.
- Fifty-eight percent (58%) of students have used e-mail to communicate with an instructor *often* or *very often*, compared with 10% of students that have *never* done so.
- Forty-eight percent (48%) have discussed grades or assignments with an instructor *often* or *very often*, compared with 9% of students that have *never* done so.
- Twenty-six percent (26%) have talked about their career plans with an instructor or advisor *often* or *very often*, but 29% have *never* done so.
- Seventy percent (70%) have *never* worked with instructors on activities other than coursework.
- Fifty-one percent (51%) of students say they *rarely* or *never* use career counseling services.
- Forty-six percent (46%) *rarely* or *never* use peer or other tutoring resources.
- Four in 10 (40%) *sometimes* or *often* use a skills lab.
- Sixty-three percent (63%) use a computer lab *sometimes* or *often*, with 32% using one *often*.

The CCSSE surveys can be found at:

Center for Community College Student Engagement. Community College Survey of Student Engagement: Key Findings, http://www.ccsse.org/survey/survey.cfm. Austin, TX, 2011.

Mathematics Courses Taught Outside of the Mathematics Program

Two-year colleges have a long history of offering mathematics courses in instructional units outside of the mathematics program. Tables TYE.14, TYE.14.1, TYE.15, and TYE.16 give the enrollment in mathematics courses offered <u>outside</u> of mathematics programs. These enrollments were estimated by mathematics program department chairs. Thus, they may not be as accurate as the numbers given for enrollment <u>within</u> mathematics programs.

In fall 2010, the total enrollment in mathematics courses outside the department was reported to be 152,000 students, a 19% decrease from 2005. Seventy-seven percent of those enrollments involved Precollege courses (Arithmetic/Pre-algebra, Elementary and

TABLE TYE.13 Percentage of two-year colleges offering various opportunities and services to mathematics students in fall 2000, 2005, and 2010.

Opportunity/Service	2000	2005	2010
A. Diagnostic or placement testing	98	97	90
a. Colleges that usually require placement tests of first-time enrollees	98	97	100
b. Colleges that use placement tests as part of mandatory placement	na	88	98
c. Colleges that periodically assess the effectiveness of their placement tests	85	81	75
B. Mathematics lab or tutorial center	98	95	*
C. Advising by a member of the mathematics faculty	33	40	42
D. Opportunities to compete in mathematics contests	28	37	41
E. Honors sections	20	24	20
F. Mathematics club	14	22	31
G. Special mathematics programs to encourage minorities	4	15	11
H. Lectures/colloquia for students, not part of math club	9	6	16
I. Special mathematics programs to encourage women	4	7	6
J. K-12 outreach opportunities	20	25	32
K. Undergraduate research opportunities	4	9	14
L. Independent mathematics studies	25	38	36
M. Other	4	4	13

* Did not collect.

TABLE TYE.14 Estimated enrollment (in 1000s) in mathematics and statistics courses taught outside of mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

Course Number	Type of course	Enrollment (in 1000s) 1995	2000	2005	2010
1-2	Arithmetic & Basic Math, Pre-algebra	54	43	60	48
3	Elementary Algebra (High School level)	41	27	65	38
4	Intermediate Algebra (High School level)	10	10	26	29
19-20	Elementary Statistics, Probability	9	7	12	12
26-27	Business Mathematics	26	18	15	19
28-29	Technical Mathematics	8	5	10	7
	Total	148	110	188	152

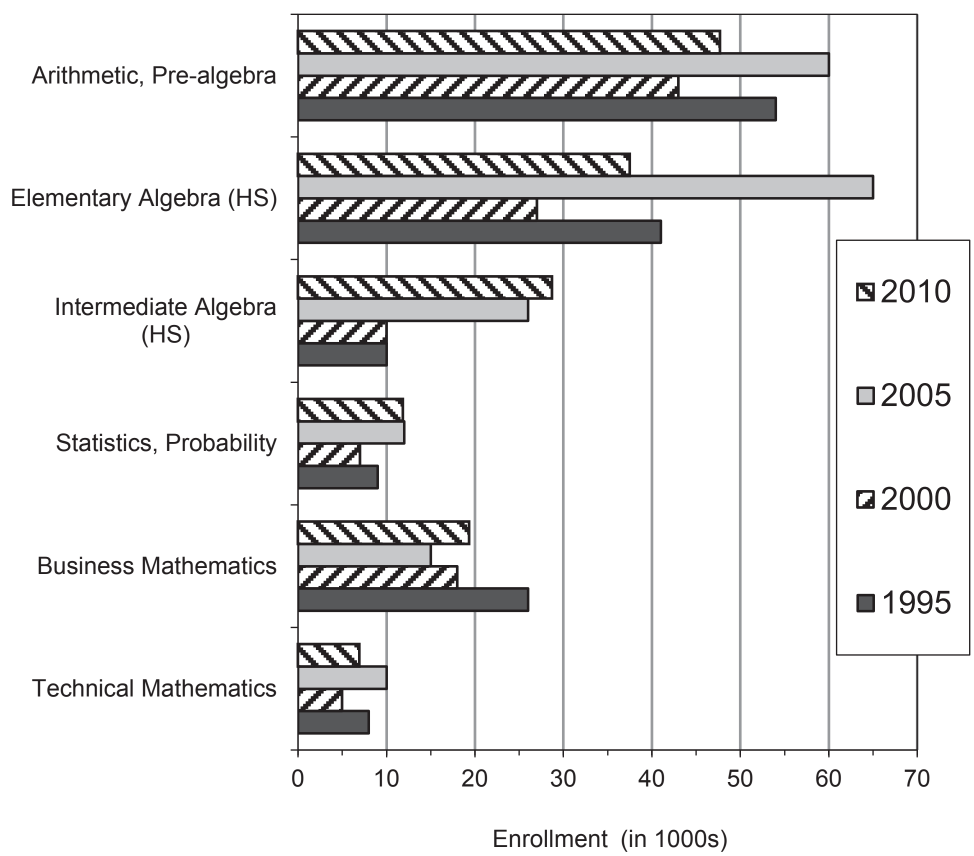

FIGURE TYE.14.1 Estimated enrollment (in 1000s) in mathematics and statistics courses taught outside of mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

Intermediate Algebra), down three points from 2005. Almost all of these courses were taught in a developmental education department or division. The other 23% (Business Mathematics, Statistics and Probability, and Technical Mathematics) were courses taught in a business or engineering division, occupational training programs, or other divisions. (See Tables TYE.14 and TYE.15.)

Precollege mathematics taught outside the mathematics program

The largest component of this "outside” mathematics enrollment was in Precollege developmental courses. The structure of Precollege course offerings within a particular college is determined by the institution’s philosophy concerning developmental education. Two views predominate. Either a student took all developmental courses (mathematics, reading, and writing) in a self-contained unit devoted to developmental studies or developmental courses were offered as part of the disciplinary curriculum.

The earliest CBMS survey for which "outside" Precollege mathematics enrollment data are available on a course-by-course basis was in 1990. The following percentages are obtained by using Tables TYE.3 and TYE.15. They trace the pattern of enrollment outside the mathematics program from 1990 to 2010 in Arithmetic, Elementary Algebra and Intermediate Algebra as a percentage of the total enrollment in the course.

	1990	1995	2000	2005	2010
Arithmetic/Pre-algebra	18%	19%	17%	20%	33%
Elementary Algebra	13%	12%	12%	15%	9%
Intermediate Algebra	9%	4%	4%	7%	8%

Looking only at percentages of total enrollment does not tell the whole story. The reported enrollment in "outside of mathematics program" Precollege-level courses had a 42% drop in enrollment from 1995 to 2000, an 89% enrollment increase from 2000 to 2005, and a 24% drop in 2010. The percentage change in the above courses of enrollment from 2005 to 2010 was Arithmetic/Pre-algebra, down 20%, Elementary Algebra, down 42%, and Intermediate Algebra, up 12%. Fluctuation in these values may be influenced by the fact that the mathematics department chairs, who do not manage these outside programs, were responsible for estimating the numbers.

Table TYE.16 shows that 29% of colleges reported some part of their developmental mathematics program was administered separately from the mathematics program, down from 31% in 2005, but the same in 2010 as both 2000 and 1995.

TABLE TYE.15 Estimated enrollment (in 1000s) in mathematics courses taught outside of mathematics programs at public two-year colleges, by division where taught, in fall 2010.

		Mathematics Enrollment (in 1000s) in Other Programs			
Course Number	Type of course	Developmental Education Dept/Division	Occupational Programs	Business	Other Depts/ Divisions
1-2	Arithmetic & Basic Math, Pre-algebra	47	1	0	0
3	Elementary Algebra (High School level)	36	0	1	0
4	Intermediate Algebra (High School level)	29	0	0	0
19-20	Elementary Statistics, Probability	0	0	9	3
26-27	Business Mathematics	0	1	18	0
28-29	Technical Mathematics	0	4	1	2
	Total	112	5	29	6

Note: 0 means less than 500 enrollments and this may cause column sums to seem inaccurate.

Special Instructional Activities in Mathematics Programs

Teacher training

Enrollment data in CBMS2005 Tables TYE.3 and TYE.5 give a partial perspective on the involvement of mathematics programs at two-year colleges in teacher education, especially in the preparation of future K-8 teachers. The expansion of two-year-college activity in this area in the last decade has been significant. Hence, the topic was one of the survey's Special Projects in CBMS2000, CBMS2005, and CBMS2010. The reader should refer to Tables SP.2 and SP.4 in Chapter 2 for a comprehensive perspective on the mathematics education of future teachers at two-year and four-year institutions. Of special note are increases in almost all categories. Forty-one percent (41%) of colleges reported organized programs in which students can complete their entire mathematics course or licensure requirements at two-year colleges. An increase was noted in "career-switchers" aiming for elementary, middle school, and secondary teaching. (See Table SP.2.)

Dual-enrollment courses

Since at least the year 2000, enrollment in dual courses had been a growing phenomenon in two-year college mathematics programs. These dual-enrollment courses earned credit both for high school graduation and at the two-year institution. In 2010, information was again collected about these courses. A discussion of the 2010 survey results, including dual-enrollment data and comparisons to what is happening in the same regard at four-year institutions, can be found with the Special Projects analysis in Chapter 2, Tables SP.18 and SP.19. Additional commentary on dual enrollment also can be found in Chapter 7 with emphasis on the credentials and the supervision of those who teach such courses.

The increase in the numbers of students involved in dual-enrollment courses in two-year colleges is notable. In 2005, 50% of all two-year college mathematics departments enrolled a total of 41,836 students. In 2010, 80,805 students received credit for the same course in high school and two-year colleges in 61% of the nation's public two-year colleges, a 92% increase from 2005. Comparing dual enrollments in fall 2010 to fall 2005, there was almost a tripling of enrollment in College Algebra, a 66% increase in Precalculus, and a 2% decrease in Calculus. See Table SP.18.

In most cases, dual courses were not "outside" the mathematics program in the sense of the CBMS survey. They had some level of supervision from the mathematics program on college campuses, and most mathematics programs counted them among the courses offered by the program. In 2010, 22% of colleges reported that they assigned their own full-time or part-time faculty members to teach courses in a high school that awards both high school and college credit. See Tables SP.18 and SP.19.

TABLE TYE.16 Percentage of two-year colleges in which some of the precollege (remedial) mathematics course offerings are administered separately from, and not supervised by, the mathematics program – e.g. in a developmental studies department or program – by type of course in fall 1995, 2000, 2005, and 2010.

Mathematics Outside of the Mathematics Department		1995	2000	2005	2010
Percentage of Two-year Colleges with some precollege mathematics courses outside of mathematics department control		29	29	31	29
Course number	Type of Course				
1-2	Arithmetic & Basic Math, Pre-algebra	19	17	20	24
3	Elementary Algebra (High School level)	12	12	15	13
4	Intermediate Algebra (High School level)	4	4	7	7

Chapter 7

Faculty, Administration, and Special Topics in Mathematics Programs at Two-Year Colleges

This chapter continues the presentation of data and analysis about mathematics faculty and programs in public two-year colleges. It reports the number, teaching conditions, education, professional activities, age, gender, and ethnicity of the faculty in these mathematics programs in fall 2010. Also included is information on mobility into, within, and out of two-year college mathematics program teaching positions. Additional analysis of the items discussed in this chapter can be found in Chapters 1 and 2, where they are discussed from a comprehensive point of view in comparison to similar data for four-year colleges and universities. In particular, Chapter 2 discusses issues related to dual enrollment, distance-learning courses, and pre-service teacher training.

CBMS survey data has been collected since 1965. However, unlike surveys prior to 1995, the mathematics faculty surveyed in 1995, 2000, 2005, and 2010 did <u>not</u> include faculty who taught in computer science programs that were separate from mathematics programs. Also, CBMS2005 and CBMS2010 include only public two-year colleges. A more detailed statement on this issue occurs at the start of Chapter 6. Information on the sampling procedure used in the 2010 survey is in Appendix II. A copy of the two-year college survey questionnaire for CBMS2010 can be found in Appendix V.

The term “full-time permanent” is used frequently in this chapter. Two-year college faculty members in this category have an ongoing stable relationship with the mathematics program similar to that of tenured and tenure-track faculty at four-year institutions. They occupy a recurring position in the college’s budget and are subject to the college’s long-term evaluation and reappointment policy. They are the group of faculty primarily responsible for teaching, curriculum development, student advising, committee appointments, and other forms of college service. Full-time faculty who are not permanent are called “temporary full-time faculty.”

The term “tenure” is not used because many two-year colleges do not have traditional tenure systems, and the use of the word “tenure” in the survey questionnaire would have been inappropriate for some respondents. At two-year colleges, faculty stability is often embodied in a sequence of recurring contracts or appointments typically running from three to five years. Full-time permanent faculty members teach full course assignments, distinguishing them from part-time or adjunct faculty. Full-time permanent faculty are distinguished from “temporary” full-time faculty who are meeting a short-term institutional need, usually employed with a one-year contract.

The Table display code in this chapter is TYF, for “two-year faculty,” since the chapter discusses issues related to faculty.

Highlights of Chapter 7

- There were 9,790 full-time permanent faculty in public two-year college mathematics programs in the United States in fall 2010. This 11% increase in faculty experienced between 2005 and 2010 is less than the 19-21% increase in student enrollment during the same period (see Chapter 6) and less than the 26% increase in student enrollment between 2000 and 2005. Addressing the disparity between full-time permanent faculty and student enrollment numbers, temporary full-time faculty increased 78% from 2005 to a total of 1083 individuals in 2010. This increase is additionally notable considering the 63% decrease in temporary full-time faculty that occurred between 2000 and 2005. See Table TYF.1.
- In fall 2010, the number of part-time faculty (23,453) in two-year college mathematics programs was more than twice the number of full-time faculty. Part-time faculty represented 70% of the total number of faculty when those paid by third parties such as school districts are included (2323). When third party payees are omitted, part-time faculty represented 68% of the total number of faculty. See Table TYF.1.
- Forty-six percent (46%) of all sections were taught by part-time faculty members, a two-point drop from 2005. See Table S.5 in Chapter 1.
- The average teaching assignment for full-time permanent faculty decreased slightly to 15 classroom contact hours in fall 2010 in comparison to 15.3 in fall 2005. See Table TYF.2.
- Table TYF.2 shows that 65% of full-time permanent faculty taught extra hours for extra pay at their own college in fall 2010, up from 53% in 2005. Of

those faculty who taught for extra pay, 47% taught 1-3 extra hours, 39% taught 4-6 hours, and 14% taught 7 or more extra hours. See Table TYF.2.

- In fall 2010, a masters degree was the terminal degree for 83% of the full-time permanent mathematics faculty members at two-year colleges, up one point from 2005. An additional 14% of full-time faculty held doctorates and 3% held bachelors degrees. Of the total full-time permanent faculty, 68% held degrees in mathematics, and 21% held degrees in mathematics education. See Tables TYF.4 and TYF.5.
- Among part-time faculty in fall 2010, 73% held a masters degree and 22% had a bachelors degree as their highest degree. A bachelors degree is generally allowed by accrediting agencies for those who teach precollege (remedial) courses or highly specialized technical courses. The percentage of part-time faculty holding a doctorate has been steady at 5% to 6% since 2000. See Table TYF.6.
- Of the total part-time faculty, 48% held degrees in mathematics, 26% in mathematics education, and 2% in statistics. See Table TYF.7.
- For the second time in a CBMS survey, the proportion of men and women among the full-time permanent faculty was evenly divided in 2005 and 2010. In 2010, women made up 49% of the part-time faculty. See Tables TYF.8, TYF.9, and TYF.17.
- In fall 2010, sixteen percent (16%) of full-time permanent faculty members in mathematics programs were ethnic minorities totaling 1566 faculty, up from 14% in 2005. The majority of faculty represented in the ethnic groups were Asian/Pacific Islander or Black (non-Hispanic). See Tables TYF.10, TYF.11, and TYF.12.
- Ethnic minorities accounted for 16% of full-time permanent faculty and 18% of full-time permanent faculty under age 40. This is lower than the percentage of masters degrees awarded to ethnic minorities in 2008-2009 (22%). See Table TYF.13.
- Among newly-hired full-time permanent faculty in fall 2010, 18% were ethnic minorities (Asian/Pacific Islander, Black, Hispanic) and 47% were women. See Table TYF.20.
- Among part-time faculty, 17% were ethnic minorities (Asian/Pacific Islander, Black, Hispanic) in fall 2010. See Tables TYF.14 and TYF.15.
- The number of full-time permanent faculty in mathematics programs at two-year colleges increased 11% from 2005 to 2010 to a total of 9,790 faculty. This was an increase of 997 new permanent faculty hires for 2010, compared to 1,833 new hires in 2005. See Table TYF.16.
- Distribution of faculty by age fluctuated in the last decade. The percentage of faculty 50-54 years of age decreased from 20% in 2000 to 11% in 2010. In contrast, the percentage increase in the number of full-time permanent faculty in the age group greater than 59 years was 11% in 2005 and 17% in 2010. The average age was 46.8 in 2010 compared with 47.8 in 2005. See Table S.18 in Chapter 1 and Table TYF.17.
- The source of 777 newly hired full-time permanent faculty in fall 2010 differed slightly from the source in 2005. A lower percentage of new full-time permanent faculty came from four-year institutions (3% in 2010 and 18% in 2005), and a larger percentage came from secondary schools (25% in 2010 and 13% in 2005). Eight-two percent (82%) of newly hired full-time faculty held masters degrees in 2010. See Tables TYF.18 and TYF.19.
- The percentage of two-year colleges requiring periodic teaching evaluations for all full-time faculty members increased from 89% in 2005 to 96% in 2010 and remained about the same for part-time faculty (88%, down from 89%). Changes in the percentages of methods used for evaluating teaching were observed with increases in observations by an administrator, written peer evaluations, and the use of self-evaluation with tools such as teaching portfolios (52% in 2010, up from 19% in 2005). See Tables TYF.21, TYF.22, and TYF.26.
- The percentage of two-year colleges requiring annual continuing education or professional development for full-time permanent faculty rose to 67%, up from 55% in 2005. The percentages of specific activities used to meet professional development requirements in 2010 were similar to those in 2005. See Table TYF.23.
- The three items reported by the highest percentage of mathematics program heads as being a major problem in 2010 were the same as in 2005:
    i. too many students needing remediation (67%),
    ii. students not understanding the demands of college work (64%), and
    iii. low student motivation (50%).

  When considering issues reported as "somewhat of a problem," the percentages for the three items above (in the same order) were 90%, 93%, and 91% of colleges. Too many students needing remediation and low student motivation were also at the top of the problems list in 2000 and near the top in 2005. See Tables TYF.24 and TYF.25.
- In fall 2010, a traditional mathematics department was found in close to half (46%) of the two-year colleges, up 7 points when compared with 2005. A combined mathematics/science department or

division was the management structure at 14% of institutions, down from 35% in 2005, while "other" department or division structures were reported at 31% of responding institutions, compared with 15% in 2005. See Table TYF.26.

- Continuing the expanded role for two-year colleges in teacher preparation, especially at the elementary school level, 36% of institutions assigned a mathematics faculty member to coordinate K-8 teacher education in mathematics. Pre-service elementary teachers could complete their entire mathematics course requirement or licensure requirements at the two-year college in 41% of institutions, up from 30% in 2005. Table SP.2 in Chapter 4 reflects increases in all percentages of organized programs for pre- and in-service teachers. See Special Topics in Chapter 2, Table SP.4.
- As reported in Chapter 6, 80,805 students were dually enrolled in fall 2010 in a two-year college mathematics course that gave credit at both the high school and at the college, almost doubling 2005 numbers. The academic control of such courses resided primarily with the two-year colleges. Ninety-six percent (96%) of two-year college mathematics programs reported that they always approved the syllabus, and 71% reported that they always chose the textbook. Forty-seven percent (47%) of the colleges reported that they controlled the choice of instructor, and 41% reported control over the design of the final exam. The majority of dual-enrollment courses were taught on a high school campus by a high school faculty member. Twenty-two percent (22%) of two-year colleges participating in dual enrollment assigned their own faculty members, teaching 8% of the dually enrolled students. See Tables SP.18 and SP.19 in Chapter 2.
- As noted in Chapter 6, twenty-nine percent (29%) of two-year colleges reported that some of their precollege (remedial) mathematics courses were administered separately from the mathematics program in fall 2010, often in a developmental studies department. This percentage was two points lower than the 31% in 2005 for precollege courses. Within precollege courses, Arithmetic/Pre-algebra taught outside the mathematics program increased four percentage points, Elementary Algebra was down two points, and Intermediate Algebra remained the same. See Table TYE.17 in Chapter 6.

The Number and Teaching Assignments of Full-time and Part-time Two-Year-College Mathematics Program Faculty

Number of full-time permanent faculty and part-time faculty

In the last decade, the number of full-time permanent mathematics faculty at two-year colleges resumed the growth trend that had characterized the period from 1980 to 1995. There was a one-time 8% decline in full-time permanent faculty between 1995 and 2000. The growth from 2005 to 2010 was 11%, following the 26% increase from 2000 to 2005. The number of full-time permanent faculty in 2010 was a record 9,790. While the increase in full-time faculty is a positive trend, the 11% increase in full-time mathematics faculty falls short of the 19% increase (excluding dual enrollment) in mathematics students from 2005 to 2010. See Table TYF.1. Dual enrollment is discussed at the end of Chapter 6, later in this chapter, and comprehensively in Chapter 2.

Another 1083 faculty were reported as "full-time temporary" in 2010, a 76% increase from 2005. The increase in mathematics faculty, both full-time permanent and full-time temporary, is attributable to the growth in enrollment. However, the larger growth in temporary faculty may be an indication of the stressed financial conditions in colleges, particularly in the last half of the decade. See Chapter 6 for two-year

TABLE TYF.1 Number of full-time permanent, full-time temporary faculty, and part-time faculty paid by two-year colleges (TYC) and by a third party (e.g. dual-enrollment instructors) in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

Two-Year Colleges	1995	2000	2005	2010
Full-time permanent faculty	7578	6960	8793	9790
Full-time temporary faculty	164	961	610	1083
Part-time faculty paid by TYC	14266	14887	18227	23453
Part-time, paid by third party	na	776	1915	2323

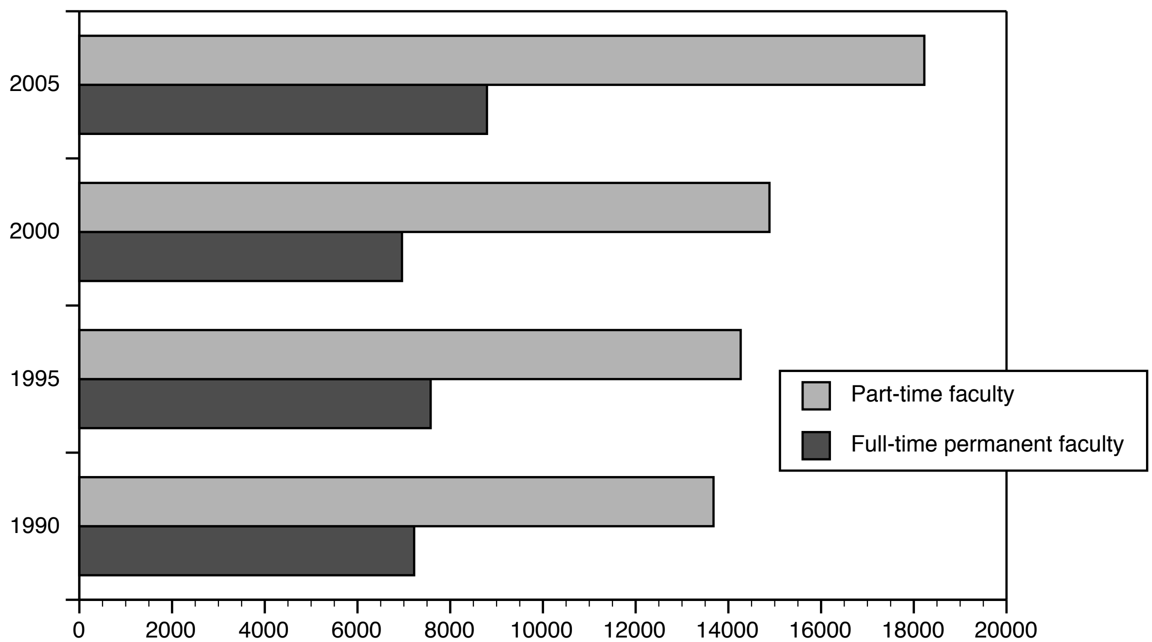

FIGURE TYF.1.1 Number of full-time permanent faculty and part-time faculty in mathematics programs in two-year colleges in fall 1990, 1995, 2000, and 2005. (Data for 2005 include public two-year colleges only.)

college enrollment data and the overall enrollment data summary in Chapter 1.

Part-time faculty members fell into two categories, those paid by two-year colleges and others paid by a third party. The latter most often were high school teachers in a school with which the college had a dual-enrollment agreement. When both categories are included, part-time faculty numbered 25,776 or 70% of the total two-year college teaching staff. When third party payees are excluded, part-time faculty members were 68% of total faculty, up two percentage points from 2005. See Table TYF.1.

Teaching assignment of full-time permanent and part-time faculty

The average required teaching assignment in weekly classroom contact hours for a full-time permanent mathematics faculty member at a public two-year college was 15 weekly contact hours in 2010. This continued a twenty-year period of oscillation. In 2005 the average was 15.3, in 2000 the average weekly contact hour assignment had been 14.8, and in 1995 it was reported as 15.8. In 1990 the number was 14.7 hours and in 1985 it had been 16.1 hours. See Tables TYF.2 and TYF.2.1.

TABLE TYF.2 Teaching assignment for full-time permanent faculty, and teaching and other duties of part-time faculty, in mathematics programs at two-year colleges in fall 2010, with 2005 data in parentheses.

	Teaching assignment in weekly contact hours					
	<10	10 to 12	13 to 15	16 to 18	19 to 21	>21
Percentage of two-year colleges	3 (0)	7 (6)	76 (79)	8 (8)	3 (4)	3 (3)
Full-time Permanent Faculty						
A. Average weekly contact hours: 15 (15.3)						
B. Percentage who teach extra hours for extra pay at their own two-year college: 65% (53%)						
C. Percentage teaching 1-3 extra hours for extra pay: 47%						
D. Percentage teaching 4-6 extra hours for extra pay: 39%						
E. Percentage teaching 7 or more extra hours for extra pay: 14%						
Part-time Faculty						
F. Percentage who teach 6 or more hours weekly: 54%						
G. Percentage of two-year colleges requiring part-time faculty to hold office hours: 28%						

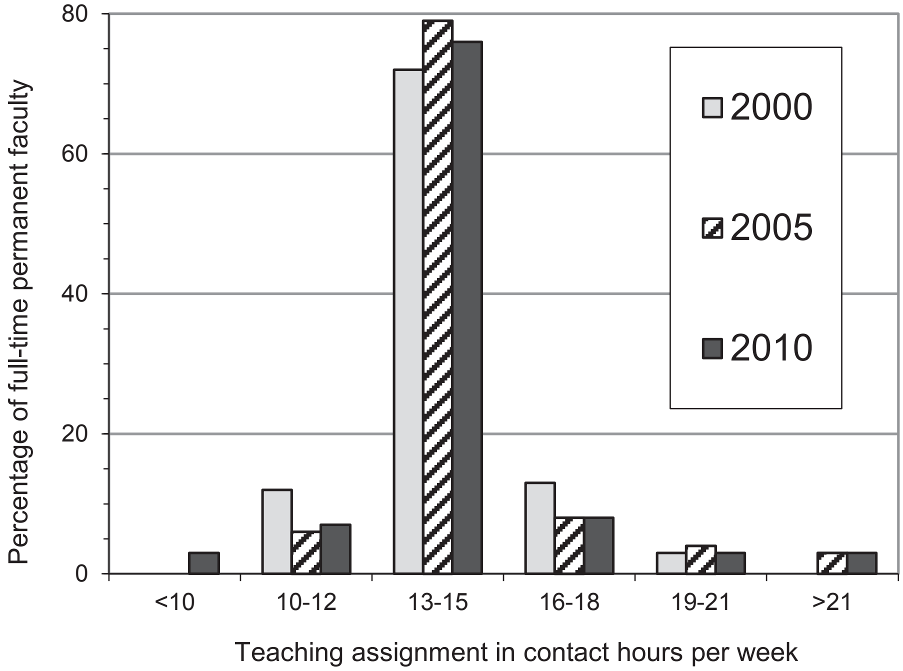

FIGURE TYF.2.1 Percentage of full-time permanent faculty with various teaching assignments in mathematics programs at two-year colleges in fall 2000, 2005, and 2010.

In 2010, the teaching requirement for full-time faculty was between 13 and 15 weekly contact hours in 76% of colleges. Fourteen percent (14%) had weekly contact hour teaching assignments greater than 15 hours, including 3% teaching more than 21 hours. Ten percent (10%) had teaching assignments below 13 weekly contact hours.

Fifty-four percent (54%) of part-time faculty members in two-year college mathematics programs taught six credit hours or more, down three percentage points from 2005. Office hours were required of part-time faculty in 28% of two-year colleges, down 9 points from 2005. See Table TYF.2.

Table TYF.2 also shows that 65% of full-time permanent mathematics faculty members at two-year colleges taught extra hours for extra pay at their own colleges, compared with 53% in 2005. Data was collected regarding the specific number of hours taught for extra pay for the first time in 2010: 47% of full-time permanent faculty taught 1-3 hours for extra pay, 39% taught 4-6 hours, and 14% taught 7 or more extra hours for extra pay.

Outflow of full-time permanent mathematics faculty

Data about outflow of permanent faculty were collected in detail prior to CBMS2010, including specific information about faculty retiring, faculty taking positions at four-year institutions, other two-year institutions, high schools, or graduate school. In CBMS2005, the number of deaths or retirements were reported as 292 persons. Because this information is difficult to obtain, CBMS2010 collected only the total number of outflow of faculty of 459 persons. The authors acknowledge that this data is difficult to collect and may not represent a true picture in the change in faculty numbers over time.

Other occupations of part-time faculty

CBMS2010 did not college information about other occupations of part-time faculty.

TABLE TYF.3 Number of full-time permanent faculty in 2009-2010 who were no longer part of the faculty in 2010-2011.

Number no longer part of 2010-2011 faculty	459
Total full-time permanent faculty, fall 2010	9790

Educational Credentials of Faculty in Mathematics Programs

Highest degree of full-time permanent faculty

A masters degree was the terminal degree for 83% of full-time permanent mathematics faculty at two-year colleges, a percentage that has increased from 79% over the last 20 years. See Table TYF.4 and Figure TYF.4.1. The percentage of faculty with a doctorate decreased to 14% in 2010, a three-point decrease over two decades. The percentage of full-time faculty whose terminal degree was a bachelors was 3% in 2010, down 1 point from 1990 and up one point from 2005. Data regarding the previous employment and degrees of *new hires* in fall 2010 can be found in Tables TYF.18 and TYF.19, along with additional discussion there.

The academic major of the highest degree of full-time permanent two-year college mathematics faculty is shown in Table TYF.5. Compared to 2005 data, the proportion of the faculty with a masters or doctorate with major field mathematics dropped two points to 68%. The percentage of faculty whose most advanced degree was in mathematics education increased three points to 21%. The percentage of degrees with majors in statistics or other fields decreased slightly.

TABLE TYF.4 Percentage of full-time permanent faculty in mathematics programs at two-year colleges by highest degree in fall 1990, 1995, 2000, 2005, and 2010.

	Percentage of full-time permanent faculty				
Highest degree	1990	1995	2000	2005	2010
Doctorate	17	17	16	16	14
Masters	79	82	81	82	83
Bachelors	4	1	3	2	3
	100%	100%	100%	100%	100%
Number of full-time permanent faculty	7222	7578	6960	8793	9790

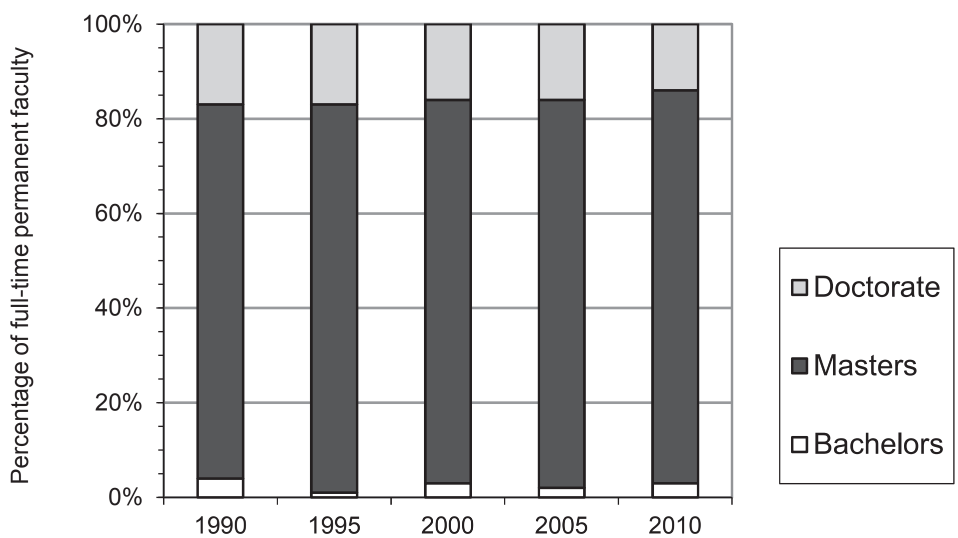

FIGURE TYE.4.1 Percentage of full-time permanent faculty in mathematics programs at two-year colleges by highest degree in fall 1990, 1995, 2000, 2005, and 2010.

TABLE TYF.5 Percentage of full-time permanent faculty in mathematics programs at public two-year colleges by field and highest degree in fall 2010.

	Percentage with highest degree			
Field of degree	Doctorate	Masters	Bachelors	Total Percent in Field
Mathematics	8	60	1	68
Statistics	0	2	0	3
Mathematics Education	3	17	1	21
Other fields	2	5	0	7
Total percentage by highest degree	14	83	3	100

Note: 0 means less than half of 1% and round-off may make column sums seem inaccurate.

TABLE TYF.6 Percentage of part-time faculty in mathematics programs at two-year colleges (including those paid by a third party, as in dual-enrollment courses) by highest degree in fall 1990, 1995, 2000, 2005, and 2010.

	Percentage of part-time faculty				
Highest degree	1990	1995	2000	2005	2010
Doctorate	8	7	6	6	5
Masters	65	76	70	72	73
Bachelors	27	18	24	22	22
Total	100%	100%	100%	100%	100%
Number of part-time faculty	13680	14266	14887	20142	25775

Highest degree of part-time faculty

Tables TYF.6 and TYF.7 as well as Figure TYF 6.1 summarize data on the highest degrees held by part-time faculty members and their fields of specialization. In fall 2010, a doctoral degree was the highest degree held by 5% of part-time faculty, down one point from fall 2005 and 2000. A masters degree was the highest degree for 73% of part-time faculty, compared to 72% in 2005. A bachelors was the highest degree for 22% of part-time faculty in 2010 and 2005.

The percentage of part-time faculty whose most advanced degree had mathematics or mathematics education as the major field of study was 74% in 2010, compared to the combined total of 76% in 2005. Two percent (2%) of part-time faculty held degrees in statistics, down one point from 2005. A three point increase was reported in "other fields." See Table TYF.7.

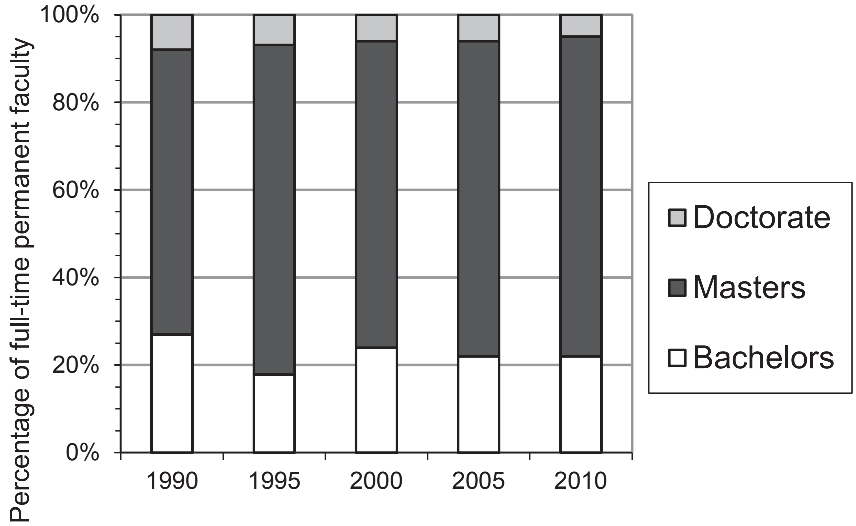

FIGURE TYF.6.1 Percentage of part-time faculty in mathematics programs at two-year colleges (including those paid by a third party, as in dual-enrollment courses) by highest degree in fall 1990,1995, 2000, 2005, and 2010.

TABLE TYF.7 Percentage of part-time faculty in mathematics programs at two-year colleges (including those paid by a third party, as in dual enrollments) by field and highest degree in fall 2010, with 2005 data in parentheses.

	Percentage having as highest degree			
Field of degree	Doctorate	Masters	Bachelors	Total Percent in Field
Mathematics	2	35	11	48
Mathematics Education	1	20	5	26
Statistics	0	2	0	2
Other fields	1	17	6	24
Total percentage by highest degree	5 (6)	73 (72)	22 (22)	100%

Note: 0 means less than half of 1% and round-off may make column sums seem inaccurate.

TABLE TYF.8 Number and percentage of total full-time permanent faculty in mathematics programs at two-year colleges by gender in fall 1995, 2000, 2005, and 2010.

	1995	2000	2005	2010
Men	4579	3537	4420	4866
	60%	51%	50%	50%
Women	2999	3423	4373	4924
	40%	49%	50%	50%
Total	7578	6960	8793	9790
	100%	100%	100%	100%

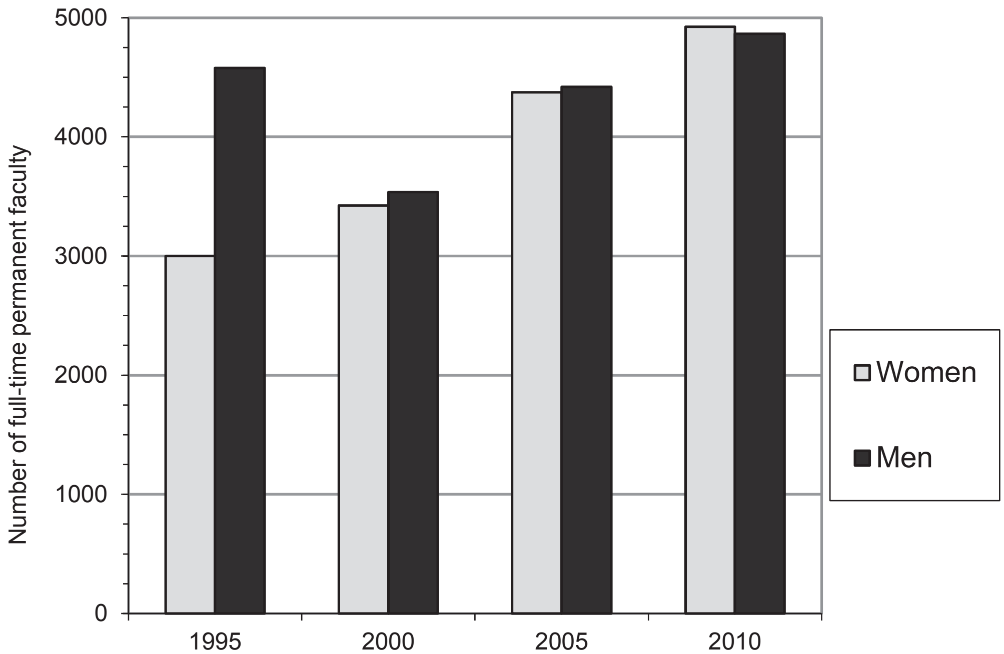

FIGURE TYF.8.1 Number of full-time permanent faculty in mathematics programs at two-year colleges by gender in fall 1995, 2000, 2005, and 2010.

Gender, Ethnic Composition, and Age of Full-time Permanent Mathematics Program Faculty

Gender of full-time permanent faculty and part-time faculty

An increase in the percentage of women among full-time permanent mathematics faculty at two-year colleges has been reported in every CBMS study since 1975. In fall 2000, the percentage of women faculty reached 49%. In fall 2005 and 2010, fifty percent (50%) of full-time permanent mathematics faculty members at the nation's public two-year colleges were women. See Table TYF.8 and Figure TYF.8.1.

Table TYF.9 reports that in fall 2010 the percentage of women among part-time faculty was 49%. This was up from 47% in fall 2005. The percentage of women was 41% among U.S. citizen/resident alien mathematics masters degree recipients in 2008-2009, the last year for which firm data were available.

Table TYF.20 presents data on the gender and ethnicity of newly hired full-time permanent mathe-

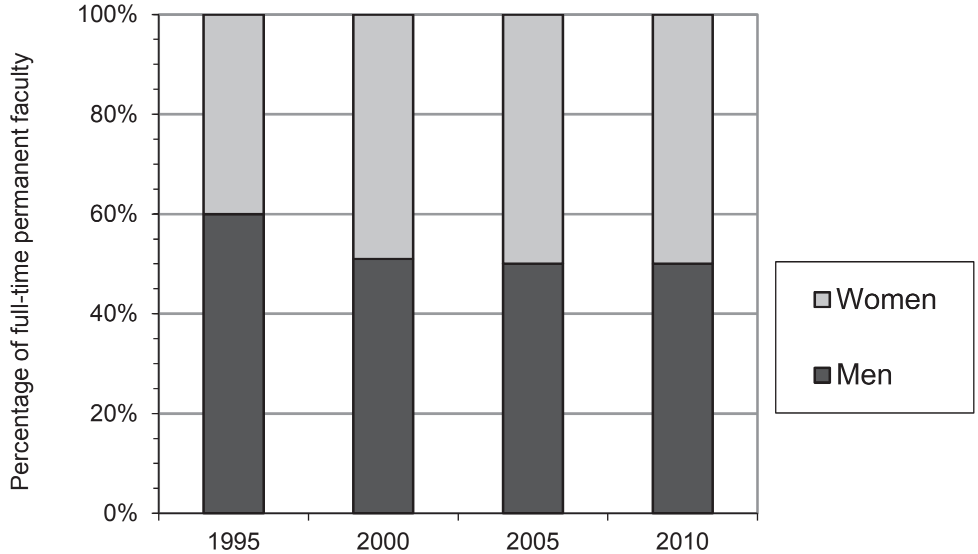

FIGURE TYF.8.2 Percentage of full-time permanent faculty in mathematics programs at two-year colleges by gender in fall 1995, 2000, 2005, and 2010.

TABLE TYF.9 Percentage of full-time permanent faculty and part-time faculty in mathematics programs at public two-year colleges by gender in fall 2010. Also masters degrees in mathematics and statistics granted in the U.S. to citizens and resident aliens, by gender, in 2008-09. Part-time faculty paid by a third party are not included.

	Percentage of		
	Full-time permanent faculty	Part-time faculty	Masters degrees in mathematics & statistics granted in the U.S. in 2008-09 to citizens and resident aliens[1]
Men	50	51	59
Women	50	49	41
Total	100%	100%	100%
Total Number	9790	23453	3137

[1] Report Table 65 from IPEDS Fall 2009 Compendium Tables, National Center for Education Statistics, *nces.ed.gov/das/library/ipeds_com.asp*. (These figures include resident aliens but do not include a total of 2074 nonresident aliens who also received masters degrees.)

matics faculty. In fall 2000, the percentage of women in this group was 42%. By fall 2005, the percentage of women among new hires had risen to 53%, but dropped to 47% in 2010.

Ethnicity among full-time permanent and part-time faculty

Demographics data about ethnic minority faculty among full-time permanent mathematics faculty members at two-year colleges are given in Tables TYF.10, TYF.11, TYF.12, TYF.13, and Figure TYF 10.1. The minority groups referenced in the survey are listed in TYF.11. Tables TYF.10 and TYF.11 provide an historical perspective, while Tables TYF.12 and TYF.13 present more detailed information on the ethnic profile of the full-time permanent mathematics faculty in fall 2010, including information about both age and gender. Tables TYF.14 and TYF.15 present data on ethnicity of part-time faculty.

The increase in the overall size of the full-time permanent mathematics faculty in the last decade (41%) was matched by growth in the number of the ethnic minority faculty (72% increase). In fall 2005, ethnic minority faculty constituted 14% of the full-time permanent faculty, numbering 1198 faculty. In fall 2010, 1566 full-time permanent ethnic minority faculty comprised 16% of total mathematics faculty. See Table TYF.10 and Figure TYF.10.1.

The relative sizes within individual ethnic groups of the full-time permanent faculty changed little between 2005 and 2010. The percentage of Black (non-Hispanic) faculty (up one point to 6%) was the same as the percentage of Asian/Pacific Islanders (6%), and both groups represented the largest ethnic minority groups in fall 2010. Mexican American/Puerto Rican/ other Hispanic also increased one point to 4%. See Table TYF.11.

Table TYF.12 gives the percentage of women within ethnic groups of the full-time permanent faculty. After a drop in the percentage of female Black (non-Hispanic) full-time permanent faculty in fall 2000 and an increase to 47% in fall 2005 (1181 faculty), that number decreased to 37%, representing 544 faculty. The percentage of female Asian/Pacific Islander and Native Hawaiian faculty rose to 48% and 49% respectively, the highest percentage of women in any of the ethnic groups. The female Asian/Pacific Islander and Native Hawaiian faculty were slightly smaller proportionally than women within White (non-Hispanic) faculty (52%). Native Americans (American Indians/Eskimo/Aleut) faculty dropped to about 0.2% (recorded as zero in the table) or a total of 20 faculty of whom 13 were women. A word of caution is in order given that CBMS2010, CBMS2005, and CBMS2000 reported a large increase in the percentage of full-time permanent faculty whose ethnicity was unknown.

Between 1995 and 2000, the percentage of ethnic minority full-time permanent mathematics faculty under the age of 40 did not change, remaining at 20%. In fall 2005, this number rose to 23% and dropped to 18% in 2010. See Table TYF.13. Even with the drop, the 18% was higher than the percentage of ethnic faculty (16% shown in Table TYF.10) among all full-time permanent faculty members. Data on ethnicity of newly-hired faculty in fall 2005 and 2010 are in Table TYF.20.

In fall 2010, seventeen percent (17%) of part-time faculty members were ethnic minorities, up one percentage point from 2005 and up 4 points as

TABLE TYF.10 Percentage and number of ethnic minority full-time permanent faculty in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

	1995	2000	2005	2010
Percentage of ethnic minorities among full-time permanent faculty	13%	13%	14%	16%
Number of full-time permanent ethnic minority faculty	948	909	1198	1566
Number of full-time permanent faculty	7578	6960	8793	9790

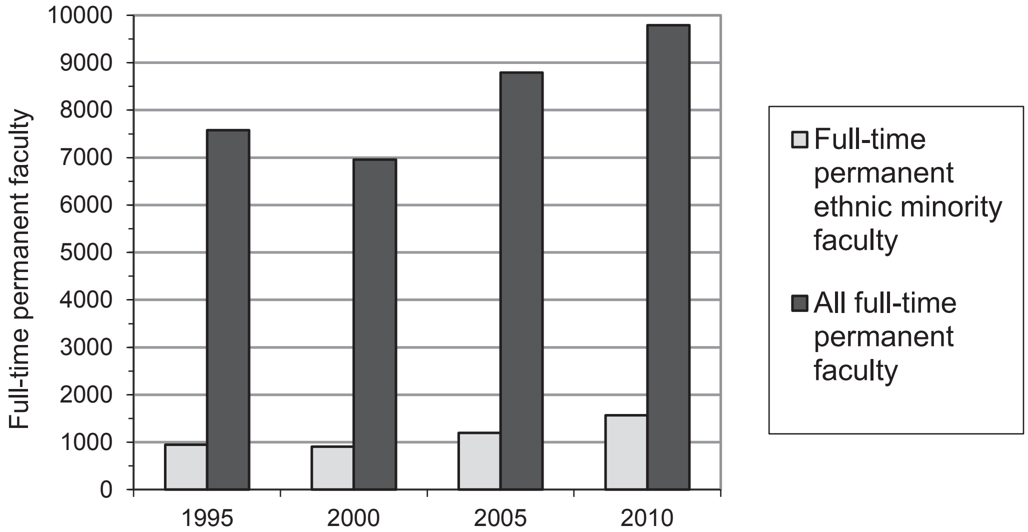

FIGURE TYF.10.1 Number of ethnic minority full-time permanent faculty and number of all full-time permanent faculty in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

TABLE TYF.11 Percentage of full-time permanent faculty in mathematics programs at two-year colleges by ethnicity, in fall 1995, 2000, 2005, and 2010.

	Percentage of full-time permanent faculty			
Ethnic Group	1995	2000	2005	2010
American Indian/Eskimo/Aleut	0	1	0	0
Asian/Pacific Islander	4	4	6	6
Black (non-Hispanic)	5	5	5	6
Mexican American/Puerto Rican/ other Hispanic	3	3	3	4
White (non-Hispanic)	87	85	84	79
Status unknown	1	2	2	5
	100%	100%	100%	100%
Number of full-time permanent faculty	7578	6960	8793	9790

Note: 0 means less than half of 1%.

TABLE TYF.12 Number and percentage of full-time permanent faculty in mathematics programs at two-year colleges by ethnic group and percentage of women within each ethnic group in fall 2010.

Ethnic Group	Number of full-time permanent faculty	Percentage of ethnic group in full-time permanent faculty	Percentage of women in ethnic group
American Indian, Alaskan Native	20	0	63
Asian	605	6	48
Native Hawaiian, Pacific Islander	42	0	49
Black or African American (non-Hispanic)	544	6	37
Mexican American,Puerto Rican or other Hispanic	356	4	34
White (non-Hispanic)	7733	79	52
Status not known or other	490	5	50
Total	9790	100%	50%

Note: 0 means less than half of 1%.

TABLE TYF.13 Percentage of full-time permanent faculty and of full-time permanent faculty under age 40 in mathematics programs at public two-year colleges by ethnic group in fall 2010. Also U.S. masters degrees in mathematics and statistics granted in the U.S. to citizens and resident aliens by ethnic group in 2008-09.

	Percentage among		
Ethnic Group	All full-time permanent faculty	Full-time permanent faculty under age 40	Masters degrees in mathematics & statistics granted in the U.S. in 2008-09 to citizens and resident aliens[1]
Ethnic Minorities	16	18	22
White (non-Hispanic)	79	74	68
Unknown	5	8	10
Total	100%	100%	100%
Number	9790	3244	3137

[1] Report Table 65 from IPEDS Fall 2009 Compendium Tables, National Center for Education Statistics, *nces.ed.gov/das/library/ipeds_com.asp.* (These figures include resident aliens but do not include a total of 2074 nonresident aliens who also received masters degrees.)

TABLE TYF.14 Percentage of ethnic minority part-time faculty in mathematics programs at public two-year colleges in fall 2000, 2005, and 2010.

	2000	2005	2010
Percentage of ethnic minorities among part-time faculty	13	16	17
Number of part-time faculty	14887	18227	23453

TABLE TYF.15 Number and percentage of part-time faculty in mathematics programs at public two-year colleges by ethnic group and percentage of women within each ethnic group in fall 2010.

		Percentage of	
Ethnic Group	Number of part-time faculty	Ethnic group among all part-time faculty	Women within ethnic group
American Indian, Alaskan Native	44	0	6
Asian	1341	6	49
Native Hawaiian, Pacific Islander	59	0	34
Black or African American (non-Hispanic)	1796	8	36
Mexican American,Puerto Rican or other Hispanic	762	3	44
White (non-Hispanic)	18105	77	51
Status not known or other	1346	6	46
Total	23453	100%	49%

compared with 2000. Similar to the ethnicity among full-time permanent faculty, Asian/Pacific Islanders and Blacks (non-Hispanic) were the two largest groups, together comprising 14% of all part-time faculty. See Tables TYF.14 and TYF.15.

Number and age distribution of full-time permanent faculty

The number of full-time permanent faculty in mathematics programs at two-year colleges increased 11% in 2010 to a total of 9,790 faculty. The total increase in faculty numbers was 997 in 2010, compared with 1,833 full-time permanent positions hired in 2005. See Table TYF.16.

During the fifteen-year period 1990 to 2005, the two-year college mathematics faculty, as a cohort, was getting older and reached an average age of 47.8 years. In fall 2010, a decrease was noted with the average faculty age being 46.8 years. Of particular interest, the percentage of full-time faculty over the age of 59 rose from 11% in 2005 to 17% in 2010, four times the percent of faculty older than 59 in 1995. See Table TYF.16. See Table S.17 in Chapter 1 for age of mathematics faculty in two-year and four-year institutions.

In 2010, the percentage of full-time permanent faculty under age 40 rose to 29%, up from 25% in 2005. See Table TYF.16. Among ethnic minority faculty, 18% were under age 40 in fall 2005, as reported in Table TYF.13. The percentage of full-time permanent faculty between the ages of 50-59 years decreased to 24% in 2010, compared with 35% in 2005. Full-time faculty over age 59 had grown to 17% in 2010 from 11% in 2005.

In 2010, women were a majority with 57% in the age group less than 35 years, up 8 points from 2005. Forty-seven percent (47%) of the age group over-54 were women. See Table TYF.17 and Figure TYF.17.1.

TABLE TYF.16 Percentage and number of full-time permanent faculty in mathematics programs at two-year colleges by age in fall 1995, 2000, 2005, and 2010.

	Percentage of full-time permanent faculty				Number of full-time permanent faculty			
Age	1995	2000	2005	2010	1995	2000	2005	2010
<30	5	4	5	8	358	290	478	832
30-34	8	9	8	9	580	615	716	893
35-39	8	13	12	12	633	890	1037	1189
40-44	14	11	13	14	1044	763	1163	1416
45-49	22	15	15	15	1672	1075	1298	1475
50-54	26	20	18	11	1933	1418	1574	1085
55-59	13	16	17	13	966	1146	1528	1268
>59	5	11	11	17	391	763	999	1631
Total	100%	100%	100%	100%	9572	6960	8793	9790

NOTE: Rounding may make column totals seem inaccurate.

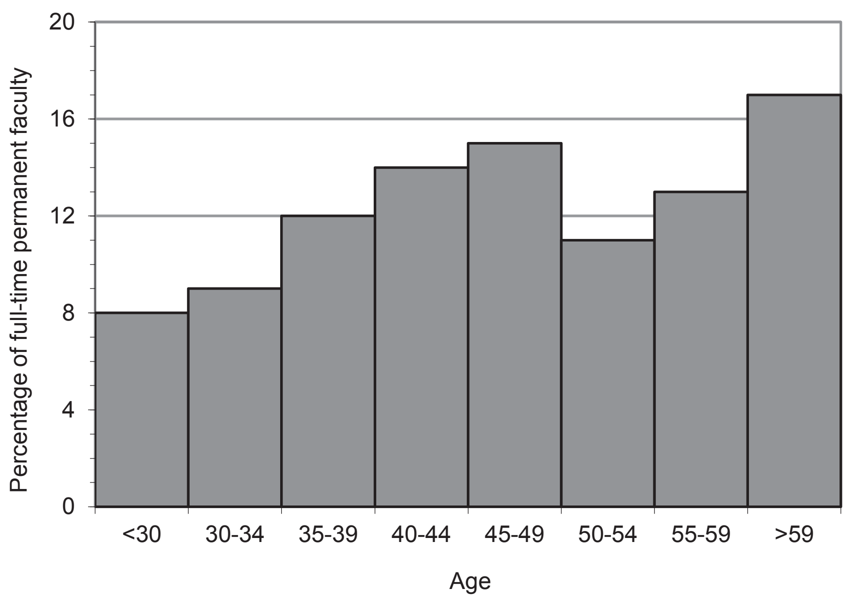

FIGURE TYF.16.1 Percentage distribution of full-time permanent faculty in mathematics programs at public two-year colleges by age in fall 2010.

TABLE TYF.17 Percentage of full-time permanent faculty in mathematics programs at public two-year colleges by age and by gender and percentage of women by age in fall 2010.

	Percentage of full-time permanent faculty		Percentage of women in age group
Age	Women	Men	
<35	10	8	57
35-44	13	13	53
45-54	13	14	48
>54	14	16	47
Total	50	50	

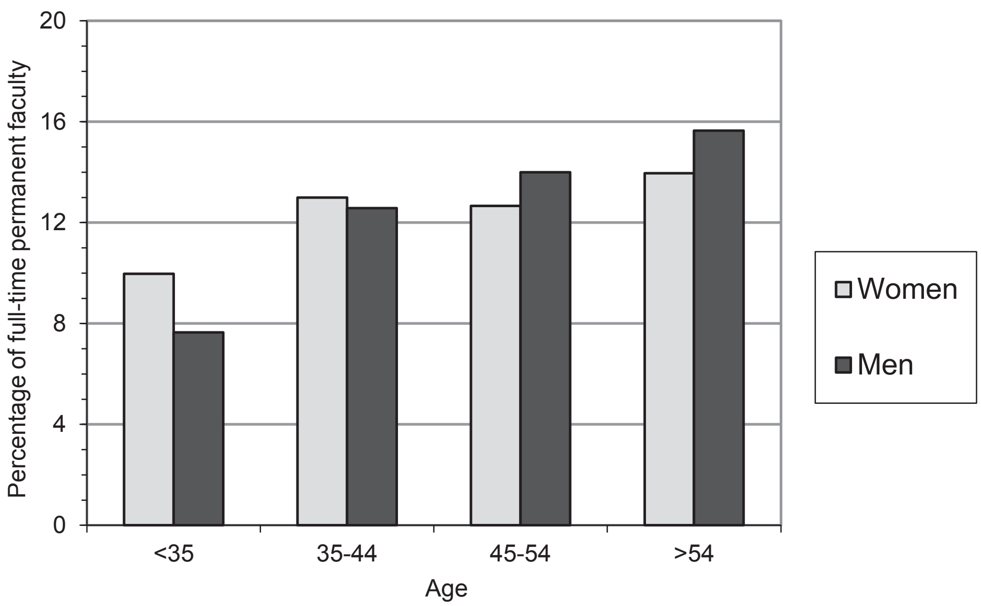

FIGURE TYF.17.1 Percentage of full-time permanent faculty in mathematics programs at public two-year colleges by age and by gender in fall 2010.

Demographics of Full-time Permanent Faculty Newly Hired by Mathematics Programs

Number and source of new full-time permanent faculty

Two-year college mathematics programs hired 777 new full-time permanent faculty members for fall 2010, up 28% over the number hired in 2005. See Table TYF.18.

Fall 2010 presented hiring pattern changes from some sources. In 2005 and 2010, graduate school as a source remained steady at 23%. In contrast, the percentage of new hires previously teaching at four-year institutions dropped to 3% in 2010 from 18% in 2005. Hiring from among part-time faculty at the same institution was down six points to 23%, while new instructors hired from a secondary school rose seven points to 25% of total new hires. See Table TYF.18.

Educational credentials of newly-hired full-time permanent faculty

The masters degree was held by 82% of newly-hired full-time permanent faculty in fall 2010, down two points from 2005, but in contrast to 2000 when the percentage was 66%. Percentage of new faculty with a doctorate degree in 2010 was 11%, close to the 12% in 2005. See Table TYF.19.

TABLE TYF.18 Percentage of newly appointed full-time permanent faculty in mathematics programs at two-year colleges coming from various sources in fall 2005 and 2010.

Percentage of new faculty from:	2005	2010
A. Graduate School	23	23
B. Teaching in a four-year college or university	18	3
C. Teaching in another two-year college	11	18
D. Teaching in a secondary school	13	25
E. Part-time or full-time temporary employment at the same college	29	23
F. Nonacademic employment	5	1
G. Unemployed	0	0
F. Unknown	1	6
Total	100%	100%
Total Number Hired	605	777

TABLE TYF.19 Percentage of full-time permanent faculty newly hired for mathematics programs at two-year colleges by highest degree in fall 2005 and 2010.

	Percentage of New Hires	
Highest Degree	2005-2006	2010-2011
Doctorate	12	11
Masters	84	82
Bachelors	5	2
Unknown	0	4
Total	100%	100%

Note: 0 means less than one-half of one percent and round-off may make column totals seem inaccurate.

TABLE TYF.20 Percentage of full-time permanent faculty newly hired for mathematics programs at two-year colleges by ethnic group in fall 2005 and 2010. Also percentage of women within each ethnic group in fall 2010.

	Percentage of new hires		Percentage of women in ethnic group for 2010-2011 new hires
Ethnic Group	2005-2006	2010-2011	
American Indian	na	0	100
Asian/Pacific Islander	7	9	70
Black (non-Hispanic)	1	5	27
Hispanic	11	4	36
White (non-Hispanic)	80	78	49
Other	na	1	0
Unknown	1	3	0
Percentage of women among all new hires	53	47	

Note: 0 means less than one-half of one percent and round-off may make column totals seem inaccurate.

TABLE TYF.21 Percentage of two-year colleges that require periodic teaching evaluations for all full-time or all part-time faculty in fall 2005 and 2010.

	Percentage of two-year colleges in fall 2005	Percentage of two-year colleges in fall 2010
Colleges that require teaching evaluations for all full-time faculty	89	96
Colleges that require teaching evaluations for all part-time faculty	89	88

TABLE TYF.22 Percentage of mathematics programs at public two-year colleges using various methods of evaluating teaching of part-time and full-time faculty in fall 2010.

	Percentage of programs using evaluation method for	
Method of evaluating teaching	Part-time faculty	Full-time faculty
A. Observation of classes by other faculty	69	64
B. Observation of classes by division head (if different from chair) or other administrator	42	55
C. Evaluation forms completed by students	97	98
D. Evaluation of written course material such as lesson plans, syllabus, or exams	53	58
E. Self-evaluation such as teaching portfolios	19	52
F. Written Peer Evaluations	11	27
G. Other methods	2	8

The CBMS2000 report voiced concern regarding the percentage of full-time permanent faculty being hired without a degree beyond the bachelors. The 2000, 2005, and 2010 data indicate a decrease of new hires with a bachelors degree from 19% to 5% to 2%, respectively.

Gender and ethnicity of newly-hired full-time permanent faculty

About 47% of new mathematics faculty hires in two-year colleges were women in fall 2010, down 6 percentage points from 2005. However, the 50-50 split between women and men in the full-time permanent faculty was maintained between 2005 and 2010. Table TYF.20 shows White (non-Hispanic) faculty comprised 78% of new hires for 2010, down 2 points from 2005. Overall, 18% of new hires in 2010 were ethnic minorities, down one point from 2005, but a five-percentage-point increase since 2000. Information about age of new hires was not collected in CBMS2010.

Teaching Evaluations and Professional Development of Mathematics Program Faculty

Computer and office facilities for part-time faculty

Information about computer and office facilities for part-time faculty was not collected in CBMS2010.

Teaching evaluation

In fall 2010 there was a seven-percentage-point increase to 96% in two-year colleges that required periodic evaluation of the teaching of full-time permanent mathematics faculty members. Periodic teaching evaluation was required for part-time faculty at 88% of colleges, a proportion almost identical to the 89% reported in 2005. See Table TYF.21.

Regarding methods of evaluating teaching, the percentage of colleges that used classroom visitation by a division or department chair or other administrator as a component of full-time faculty evaluation was 55%, down from 61% in 2005. In contrast, an increase of nine percentage points to 42% was reported in administrators observing part-time faculty. The percentage of colleges using classroom observation by other faculty (not administrators) increased from 2005 to 64% (up 12 points from 2005) for full-time faculty and 69% (up 5 points from 2005) for part-time faculty. See Table TYF.22.

In 2010 as well as in 2005, the most common method of evaluating teaching was the use of evaluation instruments completed by students. Student evaluations were used for full-time faculty in 98% of reporting colleges and in 97% of colleges for part-time faculty in 2010. Self-evaluation portfolios were used as a component of the evaluation of full-time faculty by 52% of colleges. For full-time faculty, evaluation of written materials—such as syllabi or course examinations—rose from 55% to 58%. The use of such

TABLE TYF.23 Percentage of two-year colleges that require some form of continuing education or professional development for full-time permanent faculty, and percentage of faculty using various methods to fulfill those requirements, in mathematics programs at two-year colleges in fall 2005 and 2010.

Faculty Development	Fall 2005	Fall 2010
Percentage of institutions requiring continuing education or professional development for full-time permanent faculty	55	67
How Faculty Meet Professional Development Requirements	Percentage of permanent faculty in fall 2005	Percentage of permanent faculty in fall 2010
A. Activities provided by employer	53	53
B. Activities provided by professional associations	38	34
C. Publishing books or research or expository papers	6	3
D. Continuing graduate education	7	4

written materials for part-time faculty evaluation rose four points from 2005 to 53% in 2010. In fall 2010, written peer evaluations as a category was added as a method of evaluating teaching with 27% of colleges reporting this method for full-time faculty and 11% for part-time faculty. See Table TYF.22.

Professional development obligations and activities of full-time permanent faculty

In fall 2010, as reported in Table TYF.23, some form of continuing education or professional development was required of full-time permanent faculty members at 67% of two-year colleges, up 12% from 2005. This 15-year-long increase in required professional development for full-time permanent faculty parallels the increased faculty use of various professional development opportunities, also reported in Table TYF.23. Slightly more than half of the full-time permanent faculty met part of their professional development obligation through activities provided by their own colleges in 2010 and 2005 (53%), compared to 36% in 2000. A slight decrease of four percentage points

TABLE TYF.24 Percentage of program heads classifying various problems as "major" in mathematics programs at two-year colleges in fall 1995, 2000, 2005, and 2010.

	Percentage of program heads classifying problem as major			
Problem	1995	2000	2005	2010
A. Maintaining vitality of faculty	11	9	2	4
B. Dual-enrollment courses	na	8	5	11
C. Staffing statistics courses	4	2	3	2
D. Students don't understand demands of college work	na	na	55	64
E. Need to use part-time faculty for too many courses	30	39	30	35
F. Faculty salaries too low	31	36	22	21
G. Class sizes too large	11	10	5	3
H. Low student motivation	51	47	50	50
I. Too many students needing remediation	63	62	63	67
J. Lack of student progress from developmental to advanced courses	na	na	34	37
K. Low success rate in transfer-level courses	15	8	7	13
L. Too few students who intend to transfer actually do	7	2	4	11
M. Inadequate travel funds for faculty	21	15	22	23
N. Inadequate classroom facilities for use of technology	na	na	12	10
O. Inadequate computer facilities for part-time faculty use	na	na	9	6
P. Inadequate computer facilities for student services	23	3	1	5
Q. Commercial outsourcing of instruction	na	1	0	0
R. Heavy classroom duties prevent personal & teaching enrichment by faculty	na	na	14	11
S. Coordinating mathematics courses with high schools	8	6	7	14
T. Lack of curricular flexibility because of transfer rules	6	1	7	5
U. Use of distance education	na	10	6	6

Note: 0 means less than one-half of one percent.

showed 34% of professional development activities as being provided by professional societies.

Obtaining travel funds for faculty professional development has historically been a department concern. Lack of or reduced funds available for faculty travel and other professional development activities continued to challenge mathematics departments in 2010. The concern about the level of travel funding for faculty by program heads was a "major concern" or "somewhat of a problem" in 23% of reporting colleges, up slightly from 2005 and up 8 points since 2000. See Table TYF.25.

Additional information about characteristics of two-year college faculty and their professional activities can be found in the 2011 Community College Faculty Survey of Student Engagement (CCFSSE). The CCFSSE summarizes the responses of 35,000 faculty from 228 colleges. Center for Community College Student Engagement.

Community College Faculty Survey of Student Engagement, http://www.ccsse.org/CCFSSE/CCFSSE.cfm. Austin, TX, 2011.

TABLE TYF.25 Percentage of program heads of mathematics programs at public two-year colleges classifying various problems by severity in fall 2010.

	Percentage of program heads classifying problems as		
Problem	minor or no problem	somewhat of a problem	major problem
A. Maintaining vitality of faculty	75	21	4
B. Dual-enrollment courses	61	16	11
C. Staffing statistics courses	71	13	2
D. Students don't understand demands of college work	7	28	64
E. Need to use part-time faculty for too many courses	35	28	35
F. Faculty salaries too low	49	30	21
G. Class sizes too large	80	17	3
H. Low student motivation	9	41	50
I. Too many students needing remediation	10	23	67
J. Lack of student progress from developmental to advanced courses	32	31	37
K. Low success rate in transfer-level courses	64	23	13
L. Too few students who intend to transfer actually do	66	23	11
M. Inadequate travel funds for faculty	53	23	23
N. Inadequate classroom facilities for use of technology	77	13	10
O. Inadequate computer facilities for part-time faculty use	79	15	6
P. Inadequate computer facilities for student services	83	12	5
Q. Commercial outsourcing of instruction	66	1	0
R. Heavy classroom duties prevent personal & teaching enrichment by faculty	58	31	11
S. Coordinating mathematics courses with high schools	47	39	14
T. Lack of curricular flexibility because of transfer rules	84	12	5
U. Use of distance education	68	15	6

Note: 0 means less than one-half of 1%.

Concerns and Issues in Mathematics Programs

In every CBMS survey since 1985, sixty percent or more of mathematics program heads classified "too many students needing remediation" as a *major* problem for their programs. In fall 2010, this figure was 67%. In fall 2005, the figure was 63%. See Tables TYF.24 and TYF.25.

In 2005, a new category, "students' lack of understanding of the demands of college work," was introduced. This ranked second in the list of major problems in both 2010 and 2005, as reported by 64% and 55% respectively of mathematics program heads. "Low student motivation" ranked third, as reported by 50% of mathematics program heads in 2010. Rounding out the top five major problems in 2010 were "lack of student progress from developmental to advanced courses" (37%) and "need to use too many part-time faculty" (35%). The same five topics ranked in the top five in 2000 and 2005. See Tables TYF.24 and TYF.25.

All other major issues listed showed a much lower percentage of mathematics programs reporting them than the five issues above. See Table TYF.28 for the historical perspective on these issues and the fall 1995-2010 ratings. Table TYF.29 includes data on the extent to which program heads thought these matters were somewhat of a problem, a minor problem, or no problem.

Administration of Mathematics Programs

In the last fifteen years, two-year colleges (like four-year institutions) made a major shift to the semester system. In fall 2000, 93% of two-year colleges operated under the semester structure. The use of the semester system had become so widespread after 2000 that CBMS2005 elected to omit this question from future surveys.

In 2010, 46% reported that two-year college mathematics programs were administered within a mathematics departmental structure, up seven points from 2005. A division structure, where mathematics is combined with a science department, was found in 14% of colleges, and another 31% of mathematics programs were administered by other departments or division structures, leaving 9% unreported or unknown. The shifts between 2005 and 2010 included a decrease to 14% from 35% in mathematics programs within mathematics and science departments and an increase up to 31% from 16% in 2005 of mathematics programs administered in other departments or divisions. See Table TYF.26.

Historically, mathematics courses at two-year colleges have been taught in different administrative units other than in mathematics programs/departments. The location of precollege (remedial) mathematics courses within a college's academic structure always has been of special interest. This practice continued in fall 2010, as shown in Table TYE.17 in Chapter 6. In fall 2010, about 29% of colleges reported that some precollege mathematics courses were taught outside of the mathematics program. This was down two points from the 31% reported in 2005 and the same (29%) as reported in 2000.

Topics of Special Interest for Two-Year-College Mathematics Programs

In each CBMS survey cycle, certain topics of special interest are chosen for data collection and compre-

TABLE TYF.26 Percentage of mathematics programs at public two-year colleges by type of administrative structure on their own campus in fall 2005 and 2010.

	Percentage of Mathematics Programs	
Administrative structure	2005 [1]	2010
Mathematics Department	41	46
Mathematics and science department or division	36	14
Other department or division structure	17	31
None of the above or unknown	6	9

[1] The numbers reported for 2005 come from Table TYF.30 in the 2005 CBMS report with the numbers in the two columns added.

hensive analysis across both two-year and four-year colleges. Special topics for two-year and four-year institutions are discussed in Chapter 2 of this report. Additional questions were added in 2010 regarding the various options available in precollege instruction, technology permitted by mathematics departments in precollege courses, and focus of courses titled "College Algebra" and distance-learning courses. Tables and discussion of these questions are included in Chapter 6 (Tables TYE.11, TYE.11.1, and TYE.11.2). Distance learning is discussed in Chapters 2 (Tables SP.10-SP.13) and 6 (Table TYE.12). For two-year colleges, pre-service education of K-8 teachers and faculty who teach dual-enrollment courses are relevant to the current chapter (Chapter 7) and are also discussed in Chapter 2.

Scope and organization of pre-service mathematics education for K-8 teachers

CBMS2010 continued an inquiry begun in 2000 about the level of involvement of two-year college mathematics programs in the mathematical education of future mathematics teachers. These data are reported primarily among the special topics in Chapter 2, Table SP.4.

In the last two decades, involvement in teacher education at two-year colleges has been active as more students turned to them to take required mathematics and education courses. Enrollment in the Mathematics for Elementary Teachers course fall 2010 and 2005 survey data confirm this involvement, reporting 29,000 students enrolled each year. This number was an attention-getting 61% increase from the 18,000 reported in 2000. See Table TYE.3 in Chapter 6.

Table TYE.5 shows that 55% of two-year colleges offered the course Mathematics for Elementary School Teachers in fall 2010, compared with 59% of two-year colleges in fall 2005. See Table TYE.5 in Chapter 6. The percentages of two-year colleges teaching the Mathematics for Elementary School Teachers course are successively 32%, 43%, 49%, 59% and 55% for the five-year CBMS intervals beginning in 1990 through 2010. The historical growth in offerings for this course and other selected courses at two-year colleges, beginning in 1990 for five-year CBMS intervals, is reported in Table TYE.6.

Table SP.4 in Chapter 2 reports on *organized* programs at two-year colleges in which students can obtain their entire mathematics course requirement for teacher licensure. These data confirm that two-year colleges are involved in teacher education primarily at the K-8 level, though future secondary school teachers often take their lower-division mathematics courses at two-year colleges. The single largest component is the program for pre-service elementary school teachers reported by 41% of two-year colleges in 2010. Pre-service middle school licensure-oriented programs were reported at 24% of colleges. Between 12% and 30% of two-year colleges reported programs at the elementary or middle school levels for retraining by career switchers moving into teaching. Compared with 2005, all categories of Table SP.2 except one (in-service for middle school teachers) showed increases of 3 to 11 percentage points.

Table SP.4 reports on other involvement two-year college mathematics programs have with K-8 teacher education. Thirty-six (36) percent report that a faculty member is assigned to coordinate mathematics education for future K-8 teachers. About 7% of the reporting colleges designate special sections of courses other than Mathematics for Elementary School Teachers for attendance by future teachers. Among mathematics departments, 5% offer mathematics pedagogy courses for future K-8 teachers, and 9% of colleges offer such pedagogy courses outside the mathematics department. Each category in Table SP.4 shows a slight decrease in 2010 as compared with 2005.

The conclusion in Chapter 2 is that, given the large number of two-year colleges in the United States, even when the percentage of colleges involved in the education of future K-8 teachers is small, the cumulative impact of two-year colleges on the next generation of K-8 teachers is significant. Demonstrating the national interest in the importance of two-year colleges in teacher training, a national professional organization, the National Association of Community College Teacher Education Programs (NACCTEP), was formed in 2003.

Credentials and supervision of dual-enrollment faculty

Dual enrollment in CBMS2010 is defined as a credit structure that allows high school students to receive simultaneous high school and college credit for courses that were taught at a high school by a high school teacher. Data in Chapter 2 (Tables SP.16 and SP.17) show how that by fall 2010, 80,804 students were dually enrolled, a 92% increase from 2005. Of special note in fall 2010 is the almost doubling of dual enrollment in College Algebra from 2005 to 2010 and a 66% increase in Precalculus dual enrollments from 2005 to 2010. Dual enrollments in Calculus decreased almost 2%, in contrast to dual enrollments in Statistics that increased 74%, and dual enrollment in other courses almost tripled.

In some cases, a faculty member teaching a dual-enrollment course was classified as a part-time faculty member at the two-year college that awarded college credit for the course, even though the salary was paid completely by a third party, e.g., the local school district. Table SP.17 presents data for two-year (22%) and four-year institutions (20%) that assign and pay their own faculty to teach courses in a high school that awards both high school and college credit. These direct-pay faculty members taught 6,570 of the total 80,804 (8%) dual-enrolled students. See Tables SP.18 and SP.19 in Chapter 2.

In the 2000 survey, CBMS first investigated the extent to which two-year college mathematics programs retained control of various aspects of these dual-enrollment courses. This exploration was expanded in the 2005 and 2010 surveys. While textbook choice by two-year college mathematics departments for dual-enrolled courses taught by high school teachers decreased in 2010 by 3 points to 71%, design and approval of syllabi increased to 96% of reporting colleges. See Tables SP.18 and SP.19 in Chapter 2.

As presented in SP.18, 47% of two-year college mathematics programs reported they had full control over the selection of instructors for dual-enrollment courses, down five points from the 2005 report and down 14 points from 2000. Forty-one percent (41%) of two-year college mathematics programs reported controlling the final examinations in their dual-enrollment courses.

In spite of some of the issues raised in the preceding paragraph, as reported in Tables TYF.24 and TYF.25, among all survey respondents (including respondents from colleges that do not have dual-enrollment arrangements), only 11% of mathematics program heads in two-year colleges saw dual-enrollment courses as a major problem, up seven points from 2005. Another 16% found dual-enrollment arrangements somewhat of a problem, down 5 points from 2005.

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Appendix I

Enrollments in Departmental Courses in Four-Year Colleges and Universities: 1995, 2000, 2005, 2010

TABLE A.1 Enrollment (in 1000s) in mathematics courses in fall 1995, 2000, 2005, and 2010 [with SE for 2005 and 2010 totals]. Round off may cause marginal totals to appear incorrect.

					Fall 2010 Enrollment (in 1000s)						
					Mathematics Departments						
					Total (Including Distance Courses)			Total (Non-Distance Courses)			
Courses	1995	2000	2005	2010 Total	Univ (PhD)	Univ (MA)	Coll (BA)	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal
Precollege Level											
1 Arithmetic	7	10	14 [4.7]								
2 Gen Math (Basic Skills)	13	13	16 [4.6]								
3 High School Elem Algebra	56	70	59 [9.8]								
4 High School Intermed Alg	131	117	105 [11.6]								
5 Other Precollege Level	15	8	7 [2.4]								
Subtotal Precollege Level	**222**	**218**	**201 [18.8]**	**209 [22.0]**	**57 [8.7]**	**64 [13.6]**	**88 [15]**	**56 [8.7]**	**61 [12.7]**	**84 [15.1]**	**201 [21.5]**
Introductory (Including Pre-Calc) Level											
6 College Algebra	195	211	201 [17.2]	251 [15.9]	91	57	103	88	55	99	243 [15.3]
7 Trigonometry	42	33	30 [3.5]	42 [5.2]	17	9	16	16	9	16	41 [5.0]
8 Coll Alg & Trig Combined	45	37	34 [6.8]	35 [7.6]	16	8	12	16	7	12	35 [7.4]
9 Elementary Functions [1]	86	105	93 [8.9]	114 [8.2]	46	29	39	46	28	39	112 [8.1]
10 Intro Math Modeling		13	8 [3.1]	9 [2.2]	4	1	3	4	1	3	9 [2.1]
11 Math for Liberal Arts	74	86	123 [11.7]	147 [14.4]	44	39	64	43	38	60	141 [13.8]
12 Finite Math	59	82	94 [16.1]	62 [6.7]	28	8	26	27	8	25	61 [6.6]
13 Business Math	40	53	38 [5.8]	47 [7.7]	22	13	12	22	12	11	46 [7.5]
14 Math Elem Sch Tchrs	59	68	72 [6.5]	85 [7.2]	16	29	40	15	29	36	80 [7.3]
15 Other Intro Level Math	14	36	12 [2.5]	69 [10.5]	15	19	35	15	18	33	66 [9.9]
Subtotal Introductory Level	**614**	**723**	**706 [29.0]**	**863 [35.0]**	**299 [17.0]**	**214 [20.7]**	**350 [22.4]**	**292 [17.1]**	**206 [20.0]**	**336 [21.3]**	**834 [33.8]**

[1] Elementary Functions, Precalculus, and Analytic Geometry.

TABLE A.1, Cont. Fall term mathematics course enrollment (in 1000s) [with SE for 2005 and 2010 totals].

					Fall 2010 Enrollment (in 1000s)						
					Mathematics Departments						
					Total (Including Distance Courses)			Total (Non-Distance Courses)			
Courses	1995	2000	2005	2010	Univ (PhD)	Univ (MA)	Coll (BA)	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal
Calculus Level											
16 Mainstream Calc I	192	192	201 [9.6]	235 [14.2]	111	42	82	110	41	82	234 [14.1]
17 Mainstream Calc II	83	87	85 [4.9]	129 [13.7]	61	24	44	61	23	44	128 [13.7]
18 Mainstream Calc III, IV	62	73	74 [4.0]	104 [6.2]	59	25	20	58	25	20	103 [6.2]
19 Non-Mainstream Calc I	98	105	108 [8.6]	99 [6.4]	60	22	17	60	22	17	99 [6.3]
20 Non-Mainstream Calc II	14	10	11 [2.0]								
20.5 Non-Mainstream Calc II, III, etc.				22 [3.3]	12	5	5	12	5	5	22 [3.3]
21a Diff Eq & Lin Alg (comb)	na	na	9 [2.2]	15 [2.6]	11	1	3	11	1	3	15 [2.6]
21b Differential Equations	33	34	36 [2.8]	56 [5.3]	33	10	13	33	9	13	56 [5.3]
22 Discrete Math	16	20	17 [1.9]	25 [3.7]	7	6	12	7	6	12	25 [3.7]
23 Linear/Matrix Algebra	33	41	37 [2.6]	46 [4.0]	23	9	14	23	9	14	45 [4.0]
24 Other Calculus Level	9	7	9 [2.7]	17 [3.1]	6	1	10	6	1	10	17 [3.1]
Subtotal Calculus Level	**539**	**570**	**586 [23.6]**	**748 [35.2]**	**383 [13.2]**	**145 [19.1]**	**221 [26.5]**	**380 [13.0]**	**143 [18.5]**	**220 [26.5]**	**743 [34.8]**

TABLE A.1, Cont. Fall term mathematics course enrollment (in 1000s) [with SE for 2005 and 2010 totals].

					Fall 2010 Enrollment (in 1000s)		
					Math Departments		
Courses	1995	2000	2005	2010	Univ (Phd)	Univ (MA)	Coll (BA)
Advanced Level							
25 Intro to Proofs	7	10	12 [1.3]	15 [1.2]	7	3	5
26-1 Modern Algebra I				13 [1]	4	3	6
26-2 Modern Algebra II				1 [0.1]	1	0	0
26 Modern Algebra I & II	13	11	11 [1.1]	14 -	5	3	6
27 Number Theory	2	4	3 [0.5]	4 [0.5]	1	1	2
28 Combinatorics	2	3	3 [0.5]	3 [0.5]	2	1	1
29 Actuarial Mathematics	1	1	2 [0.5]	2 [0.3]	2	0	0
30 Logic/Foundations	3	2	1 [0.4]	1 [0.2]	1	0	0
31 Discrete Structures	3	5	3 [0.7]	4 [0.9]	1	1	2
32 History of Mathematics	3	2	6 [1.0]	7 [1.4]	1	2	4
33 Geometry	6	6	8 [1.0]	10 [1]	3	2	5
34 Math for HS Teachers	5	7	8 [2.2]	8 [1]	2	3	2
35-1 Advanced Calculus I, Real Analysis I				16 [1.6]	7	3	6
35-2 Advanced Calculus II, Real Analysis II				2 [0.8]	1	0	1
35 Advanced Calculus I & II, Real Analysis I & II	11	10	15 [1.2]	18 -	8	3	7
36 Advanced Math for Engr and Physical Sci.	8	5	6 [1.1]	11 [5.3]	5	6	0
37 Advanced Linear Algebra	4	3	4 [0.7]	4 [0.5]	3	1	0
38 Vector Analysis	3	2	2 [0.8]	3 [0.5]	2	0	0
39 Advanced Differential Equations	3	2	1 [0.2]	3 [0.6]	2	1	0
40 Partial Differential Equations	1	2	3 [0.5]	4 [0.5]	2	1	0
41 Numerical Analysis I & II	6	5	5 [0.5]	7 [1.1]	4	1	2

Note: 0 means less than 500 enrollments.

TABLE A.1, Cont. Fall term mathematics course enrollment (in 1000s) [with SE for 2005 and 2010 totals].

					Fall 2010 Enrollment (in 1000s)		
					Mathematics Departments		
Courses	1995	2000	2005	2010	Univ (Phd)	Univ (MA)	Coll (BA)
(Advanced Level Contd.)							
42 Applied Math (Modeling)	4	2	2 [0.3]	3 [0.5]	1	1	1
43 Complex Variables	2	3	3 [0.5]	3 [0.3]	1	1	1
44 Topology	1	2	1 [0.3]	2 [0.2]	1	0	0
45 Math of Finance	na	na	1 [0.4]	2 [0.4]	1	0	0
46 Codes & Cryptology	na	na	0 [0.2]	0 [0.1]	0	0	0
47 Biomathematics	na	na	1 [0.2]	1 [0.2]	1	0	0
48 Senior Sem / Ind Study in Math	3	3	3 [0.5]	5 [0.5]	1	1	3
49 Other Adv Level Courses	5	10	5 [0.7]	14 [3.8]	5	6	2
Operations Research							
58 Intro Oper Res	1	1	1 [0.2]				
59 Int to Linear Programming	1	1	1 [0.4]				
60 Other Oper Research	0	0	0 [0.2]				
61 Operations Research (all courses)				2 [0.4]	1	1	1
Subtotal Advanced Level	**96**	**102**	**112 [6.2]**	**150 [6.6]**	**64**	**39**	**47**
Mathematics Total	**1471**	**1614**	**1606 [45.3]**	**1971 [72.5]**	**803**	**462**	**706**

Note: 0 means less than 500 enrollments.

TABLE A.2. Enrollment (in 1000s) in statistics courses in fall 1995, 2000, 2005, and 2010 in mathematics and statistics departments [with SE for totals]. Roundoff may cause marginal totals to appear incorrect.

					Fall 2010 Enrollment (in 1000s)								Fall 2010 Enrollment (in 1000s)						
					Mathematics Departments								Statistics Departments						
					Total (Including Dist. Courses)				Total (Non-Dist. Courses)				Total (Inc. Dist. Courses)				Total (Non-Dist. Courses)		
Statistics Courses	1995	2000	2005	Total 2010	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal	Univ (PhD)	Univ (MA)	Subtotal
Lower Level Statistics																			
Elem Statistics (no Calc prereq)	132	155	167 [14.3]	243 -	39	27	117	183 [15.6]	38	27	110	174 [15.6]	41	20	0	60 [4.9]	40	17	56 [3.9]
Introductory Statistics (Calc prereq, for non-majors)				42 -	8	5	13	26 [4.8]	8	5	11	23 -	11	5	0	16 [1.6]	11	5	16 [1.6]
Prob.& Statistics (no Calc prereq)	26	17	21 [5.5]	19 -	4	6	9	19 [3.8]	4	5	9	18 [3.7]							
Statistics for pre-service elementary or middle grade teachers				66 -									0	66	0	66 [0.1]	0	66	66 [0.1]
Statistics for pre-service high school teachers				122 -									29	93	0	122 [0.1]	29	93	122 [0.1]
Other Elem. Level Statistics	6	17	13 [2.5]	8 -	1	2	1	4 [1.1]	1	2	1	3 [0.9]	3	2	0	4 [1.4]	3	2	4 [1.4]
Subtotal Elem. Level Statistics	**164**	**190**	**202 [14.9]**	**312** -	**51**	**40**	**140**	**231 [15.8]**	**50**	**39**	**130**	**218 [15.9]**	**54**	**27**	**0**	**81 [5.5]**	**53**	**24**	**77 [4.7]**

TABLE A.2. Enrollment (in 1000s) in statistics courses in fall 1995, 2000, 2005, and 2010 in mathematics and statistics departments [with SE for totals]. Roundoff may cause marginal totals to appear incorrect.

					Fall 2010 Enrollment (in 1000s)						
					Mathematics Departments				Statistics Departments		
Statistics Courses	1995	2000	2005	Total 2010	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal	Univ (PhD)	Univ (MA)	Subtotal
Upper Level Statistics											
Math. Statistics (Calc prereq)	16	18	12 [2.1]	8 -	2	1	2	5 [0.9]	2	0	3 [0.4]
Probability (Calc prereq)	10	17	10 [1.0]	12 -	5	1	3	9 [1.1]	2	1	3 [0.3]
Prob & Statistics Combined			16 [2.0]	12 -	5	1	3	9 [1.3]	2	1	3 [0.5]
Stochastic Processes	0	1	1 [0.2]	1 -	0	0	0	0 [0.1]	0	0	0 [0.1]
Applied Statistical Analysis	9	6	7 [1.2]	5 -	1	0	1	2 [0.4]	2	1	3 [0.4]
Design & Anal of Experiments	1	2	1 [0.2]	2 -	0	0	0	1 [0.2]	1	0	1 [0.2]
Regression & Correlation	1	2	3 [0.5]	4 -	0	1	1	2 [0.5]	2	0	2 [0.2]
Biostatistics		2	2 [0.6]	1 -	0	0	0	0 [0.2]	1	0	1 [0.2]
Nonparametric Statistics		1	0 [0.1]	0 -	0	0	0	0 [0.1]	0	0	0 [0.0]

Note: 0 means less than 500 enrollments.

TABLE A.2, Cont. Fall term statistics enrollment (in 1000s) [with SE for 2005 and 2010 totals].

					Fall 2010 Enrollment (in 1000s)						
					Mathematics Departments				Statistics Departments		
Statistics Courses	1995	2000	2005	Total 2010	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal	Univ (PhD)	Univ (MA)	Subtotal
(Upper Level Statistics, Continued)											
12 Categorical Data Analysis	na	0	0 [0.1]	0 -	0	0	0	0 [0.0]	0	0	0 [0.1]
13 Survey Design & Analysis	na	0	1 [0.2]	0 -	0	0	0	0 [0.0]	0	0	0 [0.1]
Statistical Computing				0 -					0	0	0 [0.1]
Statistical Software				1 -					0	0	1 [0.1]
14 Stat Software & Computing	na	1	1 [0.2]	1 -	0	0	0	1 [0.2]			
15 Data Management	na	0	0 [0.0]	0 -	0	0	0	0 [0.0]	0	0	0 [0.0]
16 Senior Sem / Indep Stdy in Statistics	0	0	0 [0.1]	1 -	0	0	0	0 [0.2]	0	0	0 [0.0]
Bayesian Statistics				0 -					0	0	0 [0.1]
Statistical Consulting				0 -					0	0	0 [0.1]
17 Other Upper Level Statistics	7	5	3 [0.5]	4 -	1	0	0	2 [0.4]	1	0	2 [0.3]
All departmental courses other than Prob. or Stat.	7	5	3 [0.5]	8 -					0	8	8 [4.9]
Subtotal Upper Level Statistics	**44**	**45**	**57 [3.7]**	**60 -**	**15**	**6**	**11**	**32 [2.5]**	**16**	**13**	**29 [5.0]**
Statistics Total	**208**	**235**	**259 [15.4]**	**372 -**	66	45	151	262 [16.3]	70	40	110 [6.7]

Note: 0 means less than 500 enrollments.

TABLE A.3. Enrollment (in 1000s) in computer science courses in fall 1995, 2000, 2005, and 2010 [with SE for 2005 and 2010 totals]. Roundoff may cause marginal totals to appear incorrect.

					Fall 2010 Enrollment (in 1000s)						
					Mathematics Departments						
					Total (Including Distance Courses)			Total (Non-Distance Courses)			
CS Courses	1995	2000	2005	Total 2010	Univ (PhD)	Univ (MA)	Coll (BA)	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal
General Education CS Courses											
Computers & Society, Issues in Computer Science	14	4	5 [1.8]	10.1 [5.3]	0.0	0.0	10.1	0.0	0.0	9.8	9.8 [5.2]
Intro to Software Pkgs	18	25	12 [4.1]	11.1 [3.6]	0.2	0.0	10.9	0.2	0.0	7.8	8.0 [2.3]
Other CS general ed courses	6	6	11 [4.8]	9.4 [3.6]	0.3	1.1	8.0	0.3	1.1	8.0	9.4 [3.6]
Subtotal general education courses	**38**	**35**	**28 [6.2]**	**30.6 [7.3]**	**0.5 [0.2]**	**1.1 [0.9]**	**28.9 [7.3]**	**0.5 [0.2]**	**1.1 [0.9]**	**25.6 [6.6]**	**27.2 [6.7]**
Lower-Level CS Courses											
Computer Programming I *	17	23	10 [1.8]	15.2 [1.9]	1.0	1.4	12.8	1.0	1.4	12.4	14.8 [1.9]
Computer Programming II *	5	6	2 [0.6]	4.2 [1.0]	1.0	0.3	3.0	1.0	0.3	2.9	4.2 [1.0]
Discrete Structures for CS	2	4	1 [0.5]	1.5 [0.5]	0.1	0.3	1.1	0.1	0.3	1.1	1.5 [0.5]
Other Lower-level CS Courses	13	22	4 [1.1]	4.4 [1.3]	0.3	0.1	4.0	0.3	0.1	3.4	3.8 [1.1]
Subtotal Lower-Level CS	**37**	**55**	**18 [2.9]**	**25.4 [3.2]**	**2.5 [1.3]**	**2.1 [0.6]**	**20.9 [2.9]**	**2.5 [1.3]**	**2.1 [0.6]**	**19.8 [2.9]**	**24.3 [3.2]**
All intermediate-level courses	13	18	8 [1.4]	11.7 [1.8]	0.9 [0.5]	1.4 [0.5]	9.4 [1.6]	0.9 [0.5]	1.4 [0.5]	9.0 [1.6]	11.4 [1.8]
All upper-level CS courses	12	17	5 [1.3]	9.8 [2.4]	0.7 [0.4]	1.1 [0.5]	7.9 [2.3]	0.7 [0.4]	1.1 [0.5]	7.9 [2.3]	9.8 [2.4]
Total Computer Science	**100**	**123**	**59 [9.9]**	**77.4 [11.2]**	**4.6 [2.1]**	**5.7 [1.8]**	**67.1 [10.9]**	**4.6 [2.1]**	**5.7 [1.8]**	**62.3 [10.1]**	**72.6 [10.5]**

* For 1995 and 2000, this course category was described in the 1991 ACM/IEEE CS curriculum report. For 2005, these courses were described in the 2001 ACM/IEEE report "Model Curricula for Computing."

Appendix II, Part I

Sampling and Estimation Procedures

Diana Stukel, Annie Lo, and **Bradford Chaney, Westat**

Overview

A stratified, simple random sample was employed in the CBMS 2010 survey, and strata were based on three variables: curriculum, highest degree level offered, and total institutional enrollment. Data were collected using an online survey with email and telephone followup.

Sampling Approach

For CBMS 2010, the basic design was a stratified simple random sample of institutions. A compromise mix of statistically optimum Neyman allocations based on two key outcome variables was used to determine targeted sample sizes for the 28 sampling strata.

Target Population and Sampling Frames

The Integrated Postsecondary Education Data System (IPEDS), a database maintained by the National Center for Education Statistics within the U.S. Department of Education, was used as a basis for building a frame for this survey. For the academic year 2008-2009, there were approximately 6,800 colleges and universities across the country, according to IPEDS. Of these, 2,593 had mathematics or statistics departments (or both). AMS conducts annual surveys of four-year institutions, and thus has reasonably current information for four-year institutions; this information was used as a basis for updating the IPEDS frame. AMS and Westat also contacted two-year institutions to obtain updated information for them. Two primary considerations with regard to two-year institutions were determining how the institutions organized mathematics within departments or divisions (e.g., there may be a combined division of science and mathematics), and whether the systems were centralized (so that one institution had all required information) or decentralized (so that each campus must be surveyed separately, and the sampling unit would be the campus rather than the institution). In the case of decentralization, IPEDS generally has information for the overall institution rather than for each individual campus, so the IPEDS-based frame was modified to include the individual campuses.

In 2010, the Mathematical Association of America (MAA) also conducted a survey of faculty and students of two-year and four-year colleges and universities where calculus is taught. Although the two surveys (CBMS and MAA) were administered separately and at different times, and although the surveys targeted somewhat different respondents (department heads for the CBMS survey, and faculty and students for the MAA survey), a joint sampling plan to serve both surveys simultaneously was developed. Thus, the overarching aim was to optimize the allocation for both surveys while minimizing overlap between them wherever possible.

The target population of the CBMS 2010 survey consisted of undergraduate mathematics and statistics programs at two-year and four-year colleges and universities in the United States. Thus the frame for the CBMS 2010 survey was divided into three parts: (A) 1,393 institutions having four-year math programs, (B) 79 institutions having four-year statistics programs, and (C) 1,121 institutions having two-year math programs, for a total of 2,593 institutions having programs eligible for participation in the survey. In most cases, these programs were within established academic departments, but at times they were part of more comprehensive departments (i.e., covering more topics than mathematics and/or statistics) or divisions. Note that parts A and B did not necessarily consist of mutually exclusive institutions since some institutions had both four-year math programs and four-year statistics programs. However, this was not problematic since the math and statistics programs within these institutions were the targets of interest, and the departments were sampled independently.

Sampling Strata

The three parts of the frame were each stratified using the same two variables that were used in the previous two rounds of the CBMS survey, that is, "Highest Degree Granted by the Institution" (PhD, MA, or BA) and "Institutional Full Time Equivalent (FTE) Undergraduate Fall Enrollment." This initially resulted in the same 24 strata that were used for CBMS 2005. For this round of the survey, however, the values for the stratification variables were taken from IPEDS 2008. A further refinement to the stratification was made by calculating the standard errors for each of the strata in parts A and C using data for two key outcome variables from CBMS 2005 – "Total Student Enrollment in Math Department's Undergraduate Courses, Previous Fall (2004)" and "Number of Full-Time Tenured or Mathematics Faculty in Fall 2005." The standard errors were used as a gauge to assess how homogeneous the strata were. Based on this calculation, four additional strata were created (for a total of 28 strata) by splitting four of the original strata. The four original strata had the highest standard errors for both variables considered amongst the 24 strata, and thus it was felt that splitting them would create more homogeneous strata. The final stratification can be seen in the first four columns of Table 1. The four-year mathematics programs were divided into fifteen strata, the four-year statistics programs were divided into five strata, and the two-year programs were divided into eight strata. Note that the four pairs of strata labeled 1 and 2; 3 and 4; 8 and 9; and 25 and 26 were originally combined in CBMS 2005. The stratification for part B of the frame remained unchanged from CBMS 2005.

Allocation Process

For the CBMS 2010 survey, a stratified simple random sample of 600 institutions was drawn from parts A, B, and C. For CBMS 2010, since there were only 79 institutions within part B of the frame (four-year Statistics), and since each of the five strata within part B had fewer than 25 institutions, a decision was made to sample all 79 institutions, forcing strata 16-20 to be certainty strata. Thus, the remaining 521 sampled institutions for CBMS 2010 were sampled from parts A and C of the frame.

In order to allocate the sample optimally to each of the 23 strata, Neyman allocation was used. This form of allocation distributes sample to the strata proportionately to the overall number of institutions on the frame belonging to each stratum, while adjusting the allocation to give more sample to those strata with greater variability (larger standard errors) with respect to key variables. The standard errors for the same two key variables that were used in the stratification process ("Total Student Enrollment in Math Department's Undergraduate Courses, Previous Fall (2004)" and "Number of Full-Time Tenured (four-year) or Mathematics (or two-year) Faculty in Fall 2005") were used for this purpose. The same basic methodology that was used in CBMS 2005 was followed here. That is, separate Neyman allocations were calculated based on standard errors of the two key variables and then a composite combination of the two allocations was calculated by giving the Neyman allocation based on the first variable (enrollment) a relative weight of 0.75 and the Neyman allocation based on the second variable (faculty) a relative weight of 0.25. Giving a higher relative weight to enrollment seemed to be a reasonable approach given that this variable was deemed to be more salient to the study and had greater variability in the stratum-level standard errors than the faculty variable.

Given that one of the interests of this study was to obtain estimates at the level of the three program types (A, B, and C), it was necessary to ensure estimates of roughly equal precision (i.e., having the same variances) at these three levels. However, given that a "census" of institutions from the four-year statistics part of the frame was taken, there was no sampling error associated with estimates from part B. Therefore, the sampling strategy was limited to ensuring equivalent precisions for estimates coming from the two other levels (parts A and C), and the Neyman allocation was constrained to ensure this. For the purposes of this exercise, the precision under the composite Neyman allocation was approximated by using variances of the same two key variables as were used above from CBMS 2005, at the aggregate part A and C levels. Variances for each of the two key variables under the composite allocation were considered separately. Given the identical sample sizes for the two surveys, it seemed reasonable that the allocations for the two surveys should be identical as well. Thus, the constrained allocation was achieved by initially allocating roughly half of the 521 institutions to each of parts A and C, performing Neyman allocations to the fifteen strata in part A and eight strata in part C, and computing the two variances for parts A and C. The above process was iteratively reworked until approximate equivalence between the variances for parts A and C was achieved. That is, the fifty percent allocation of the 521 sampled institutions to each of parts A and B was re-adjusted to be disproportionate, the Neyman allocation to the fifteen plus eight strata was recomputed, and the variances of parts A and B were also re-computed until the variances roughly matched.

Because another important aspect of the design was the need to minimize the overlap between the CBMS 2010 survey and the MAA 2010 survey while minimizing the overall aggregate level variances, four scenarios were considered under the constrained Neyman allocation procedure described in the above paragraph. The first scenario forced strata 6 and 28 to be certainty strata, since their universe sizes were so small (six institutions each) and since a Neyman allocation would force such a capping regardless. This scenario was compared with three other scenarios where strata 5, 9, and 27 were successively also added as certainty strata to the two initial certainty strata, since their individual stratum level variances were greatest amongst all strata and since their universe sizes were smallest. Of the four scenarios considered above, the one having the minimum overall variances (for both enrollment and number of faculty) while maintaining the smallest amount of overlap was the one for which strata 5, 6, and 28 were designated as certainty strata. Note that this design assumed that both the CBMS 2010 and the MAA 2010 surveys would be administered to each institution within each certainty stratum (and therefore each institution within such strata would be visited twice). Note that this design also generated additional overlap from strata where greater than half the institutions comprising the universe were sampled – stated otherwise, where the sampling rate, given by the number of sampled institutions divided by the number of institutions in the universe, was greater than 0.5.

The resultant "optimal" sample for both CBMS 2010 and MAA 2010 consisted of 314 institutions sampled from part A (including the two certainty strata, strata 5 and 6, of size nineteen and six, respectively), and 207 institutions (including the one certainty stratum, stratum 29, of size six), for a total of 521 institutions. See Table 1 below for details of the final allocation given in the columns labeled "Universe" (or number of institutions on the frame), "Final Sample Allocation", and "Sampling Rate". Note that, apart from the three certainty strata, where there was 100% overlap between the two samples, there were also five strata where the sampling rate was greater than 0.5, indicating partial overlap between the two samples. The overall number of overlapped institutions between the two samples was 75; that is, 31 from the three certainty strata and 44 from the five strata where the sampling rate was greater than 0.5. The overlap of 75 institutions represented roughly 15% of the 521 sampled institutions; it was not possible to reduce this any further given the modest universe sizes within each stratum.

For each of CBMS 2010 and MAA 2010, 314 institutions were drawn from part A (drawing separately for each of the fifteen strata in accordance with the specific allocation in Table 1), and 207 institutions from part C (drawing separately for each of the eight strata in accordance with the specific allocation in Table 1). Additionally, for CBMS 2010, the 79 certainty institutions from part B (with sampling rates of 1.0) were added to the 521 institutions drawn from parts A and C, giving a total sample size of 600 institutions.

The final column of Table 1 also gives the "Raw Sampling Weights" which were adjusted for non-response after the surveys were conducted. In so doing, final sampling weights were produced, which can be used for estimation purposes.

TABLE 1: Stratum Designations and Final Allocation for

the CBMS 2010 Study (Program Types A, B, and C) and the MAA 2010 Study (Program Types A and C)

Stratum	Program Type	Highest Degree Granted	FTE Undergraduate Fall Enrollment	Universe (N)	Final Sample Allocation (n)	Sampling Rate (n/N)	Raw Sampling Weights (N/n)
1	Four-Year Math (A)	PhD	0-7,499	49	18	0.37	2.72
2			7,500-14999	55	35	0.64	1.57
3			15,000-19,999	43	25	0.58	1.72
4			20,000-24,999	25	17	0.68	1.47
5			25,000-34,999	19	19	1.00	1.00
6			35,000+	6	6	1.00	1.00
7		MA	0-6,999	85	28	0.33	3.04
8			7,000-10,999	52	13	0.25	4.00
9			11,000-14,999	23	16	0.70	1.44
10			15,000+	21	3	0.14	7.00
11		BA	0-999	193	16	0.08	12.06
12			1,000-1,499	201	14	0.07	14.36
13			1,500-2,499	271	25	0.09	10.84
14			2,500-4,999	244	39	0.16	6.26
15			5,000+	106	40	0.38	2.65
16	Four-Year Statistics (B)	PhD	0-14,999	17	17	1.00	1.00
17			15,000-24,999	23	23	1.00	1.00
18			25,000-34,999	11	11	1.00	1.00
19			35,000+	4	4	1.00	1.00
20		MA/BA	All	24	24	1.00	1.00
21	Two-Year Schools (C)	N/A	0-999	162	7	0.04	23.14
22			1,000-1,999	246	17	0.07	14.47
23			2,000-3,999	310	54	0.17	5.74
24			4,000-7,999	265	69	0.26	3.84
25			8,000-11,499	81	31	0.38	2.61
26			11,500-14,999	33	12	0.36	2.75
27			15,000-19,999	18	11	0.61	1.64
28			20,000+	6	6	1.00	1.00

Weighting Approach

Sampling weights adjusted for non-responding institutions were created for weighted data analysis. To facilitate the calculation of standard errors of estimates derived from the CBMS using the stratified jackknife method, replicate weights were created. Nonresponse adjustments were also applied to each set of replicate weights.

Sampling Weights

The raw sampling weight in the h^{th} stratum was computed as N_h/n_h, where N_h is the total number of institutions in the h^{th} stratum and n_h is the number of selected institutions in the h^{th} stratum. After the sample had been selected, a number of programs were identified as ineligible in their sampling strata, for the following reasons:

- Institutions have graduate programs only but were classified as a four-year program based on the sampling frame;
- Institutions no longer had mathematics (statistics) programs but were classified as a mathematics (statistics) program;
- Institutions were reclassified from a two-year mathematics program to a four-year mathematics program;
- Duplicate institutions (with different IDs on the sampling frame) were found.

In the weighting process, N_h and n_h were adjusted accordingly to account for these ineligible units. For example, N_h was reduced by the number of ineligible institutions in the h^{th} stratum. In the event that the ineligible institutions were sampled, n_h was also reduced by the number of ineligible institutions.

To remove bias from the estimates and reduce variability of the estimates, the raw sampling weights were adjusted for nonresponse. Within stratum h, a nonresponse adjustment factor, f_h, was calculated as

$$f_h = \frac{\sum_{eligible} W_h}{\sum_{responding} W_h}$$

where W_h is the raw sampling weight. Small cells in a stratum with less than 10 institutions or large nonresponse adjustment exceeding 2.5 were collapsed with an adjacent cell within program type and highest degree granted. The analysis weight, W_h^*, for any respondent in the h^{th} stratum was computed as

$$W_h{}^* = W_h f_h.$$

See Tables 2, 3, and 4 for the weights used in the four-year mathematics, four-year statistics, and two-year mathematics categories, respectively. Note that N_h' and n_h' in the tables reflect the number of eligible institutions in the h^{th} stratum.

Table 2. Final sampling weights used in the four-year mathematics questionnaire

Stratum (h)	Universe (N_h')	Number selected (n_h')	Number of completes (m_h)	Number of ineligibles	Response rate	Raw sampling weight (W_h)	Nonresponse adjusted factor (f_h)	Final sampling weight (W_h*)
1	49	18	14	1	0.778	2.722	1.286	3.500
2	55	35	26	1	0.743	1.571	1.346	2.115
3	43	25	21	0	0.840	1.720	1.190	2.048
4	25	17	11	0	0.647	1.471	1.545	2.273
5	18	18	14	1	0.778	1.000	1.200	1.200
6	6	6	6	0	1.000	1.000	1.200	1.200
7	85	28	18	0	0.643	3.036	1.658	5.032
8	52	13	7	0	0.538	4.000	1.658	6.631
9	23	16	12	0	0.750	1.438	1.408	2.024
10	21	3	2	0	0.667	7.000	1.408	9.856
11	192	15	8	1	0.533	12.800	1.510	19.323
12	201	14	11	0	0.786	14.357	1.510	21.674
13	270	25	19	0	0.760	10.800	1.316	14.211
14	244	39	27	0	0.692	6.256	1.444	9.037
15	106	40	34	0	0.850	2.650	1.176	3.118
Total	1,390	312	230	4	0.737			

Table 3. Final sampling weights used in the four-year statistics questionnaire

Stratum (h)	Universe (N_h')	Number selected (n_h')	Number of completes (m_h)	Number of ineligibles	Response rate	Raw sampling weight (W_h)	Nonresponse adjusted factor (f_h)	Final sampling weight (W_h*)
16	17	17	12	0	0.706	1.000	1.417	1.417
17	23	23	17	0	0.739	1.000	1.375	1.375
18	10	10	7	1	0.700	1.000	1.375	1.375
19	4	4	4	0	1.000	1.000	1.000	1.000
20	22	22	13	2	0.591	1.000	1.692	1.692
Total	76	76	53	3	0.697			

Table 4. Final sampling weights used in the two-year mathematics questionnaire

Stratum (h)	Universe (N_h')	Number selected (n_h')	Number of completes (m_h)	Number of ineligibles	Response rate	Raw sampling weight (W_h)	Nonresponse adjusted factor (f_h)	Final sampling weight (W_h*)
21	157	6	4	0	0.667	26.167	1.315	34.404
22	243	18	15	0	0.833	13.500	1.315	17.750
23	309	54	32	0	0.593	5.722	1.688	9.656
24	265	68	27	1	0.397	3.897	2.466	9.611
25	80	30	13	1	0.433	2.667	2.466	6.577
26	33	12	5	0	0.417	2.750	2.145	5.900
27	18	11	6	0	0.545	1.636	2.145	3.511
28	6	6	3	0	0.500	1.000	2.145	2.145
Total	1,111	205	105	2	0.512			

Replicate Weights

Weighted estimates and standard errors were calculated using a replication method, JKn (Jackknife method n, or the stratified jackknife method). The idea behind replication is to select subsamples (replicates) repeatedly from the whole sample, calculate the statistic of interest for each subsample, and then use these subsamples or replicate statistics to estimate the variance of the full-sample statistics. The JKn method divides the sample into subsamples by excluding one unit at a time.

For the CBMS, 68 replicates were created for the four-year mathematics program, and 60 replicates were created for the two-year mathematics programs. The replicates were designed in such a way so that on average, each replicate contained four to five sampled institutions. For the four-year statistics program, each sampled institution constituted a replicate, resulting in 75 replicates. The same nonresponse adjustment used for the full sample was applied to each replicate.

In stratum 6 and stratum 19, all the institutions were selected and all of them responded. These self-representing institutions were excluded from the computations involved in creating the replicate weights for non-self-representing institutions. Replicate weights associated with self-representing institutions were set equal to their full-sample weights. By handling the self-representing institutions in this manner, they were included in the population estimates but did not contribute to the resulting variance.

See Tables 5, 6, and 7 for the replicates for the four-year mathematics, four-year statistics, and two-year mathematics categories, respectively.

For variance estimation purposes, the "Stratum" in Tables 5, 6, and 7 is referred to as the variance stratum (VarStrat). The sampled institutions in a VarStrat are the variance units (VarUnits). For the first replicate weight, the full sample of institutions in the first VarStrat and VarUnit were multiplied by 0 and the weights associated with the other VarUnits in the same VarStrat and adjusted by $n_h'/(n_h'-1)$ to account for reducing the sample. The weights of the institutions in other VarStrat were not changed. The remaining replicates were formed in the same manner by systematically dropping each of the remaining VarUnits and computing the replicate weights as described for the first replicate.

Variance Estimation

Suppose that $\hat{\theta}$ is the full-sample estimate of some population parameter θ. The variance estimator using the JKn method, $v(\hat{\theta})$, is

$$v(\hat{\theta}) = \sum_{g=1}^{G} f_g h_g (\hat{\theta}_{(g)} - \theta)^2,$$

where

$\hat{\theta}_{(g)}$ is the estimate of θ based on the observations included in the g-th replicate,

G is the number of replicates formed,

f_g is the finite population correction (FPC) factors for replicate g, and

h_g is the JKn factors for replicate g.

The FPC is an adjustment to the estimated variance that accounts for how large a fraction of the population is selection for the sample. For replicate g, the FPC factor is $f_g = 1 - m_h/N_h'$, where m_h is the number of completes shown in Tables 2, 3, and 4. The JKn factor is computed as $h_g = (n_h' - 1)/n_h'$.

See Tables 5, 6, and 7 for the JKn factors and FPC factors for the four-year mathematics, four-year statistics, and two-year mathematics categories, respectively.

Table 5. Replicates, JKn factors, and FPC factors for the four-year mathematics program

Stratum (h)	Replicate (g)	Number of replicates	JKn factors	FPC factors
1	1-4	4	0.750	0.71
2	5-12	8	0.875	0.53
3	13-17	5	0.800	0.51
4	18-21	4	0.750	0.56
5	22-25	4	0.750	0.26
7	26-31	6	0.833	0.79
8	32-34	3	0.667	0.87
9	35-37	3	0.667	0.48
10	38-40	3	0.667	0.90
11	41-43	3	0.667	0.96
12	44-46	3	0.667	0.95
13	47-51	5	0.800	0.93
14	52-59	8	0.875	0.89
15	60-68	9	0.889	0.68

Table 6. Replicates, JKn factors, and FPC factors for the four-year statistics program

Stratum (h)	Replicate (g)	Number of replicates	JKn factors	FPC factors
16	1-17	17	0.941	0.29
17	18-40	23	0.957	0.26
18	41-51	11	0.909	0.36
20	52-75	24	0.958	0.46

Table 7. Replicates, JKn factors, and FPC factors for the two-year statistics program

Stratum (*h*)	Replicate (*g*)	Number of replicates	JKn factors	FPC factors
21	1-6	6	0.833	0.97
22	7-10	4	0.750	0.94
23	11-23	13	0.923	0.90
24	24-40	17	0.941	0.90
25	41-48	8	0.875	0.84
26	49-51	3	0.667	0.85
27	52-54	3	0.667	0.67
28	55-60	6	0.833	0.50

WesVar, a variance estimation software designed for complex surveys, was used to calculate estimates and standard errors of the estimates for the CBMS using the JKn replication method. WesVar can be used with a wide range of complex sample designs, including multistage, stratified, and unequal probability samples. The replicate variance estimates can reflect many types of estimation schemes, including nonresponse adjustment, poststratification, raking, and ratio estimation. It computes variance estimates for medians, percentiles, ratios, difference of ratios, and log-odds ratios.

Appendix II, Part II

Sampling and Estimation Procedures: Four-Year Mathematics and Statistics Faculty Profile

James W. Maxwell
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Overview

In CBMS surveys prior to 2005, information on the faculty was based on data collected on the CBMS form. Starting with the 2010 CBMS survey, the information on the faculty at four-year colleges and universities was based on a separate survey conducted by the American Mathematical Society under the auspices of the AMS-ASA-MAA-SIAM Data Committee. The Departmental Profile Survey is one of several surveys of mathematical sciences departments at four-year institutions conducted annually as part of the *Annual Survey of the Mathematical Sciences.* For 2010 the Departmental Profile Survey form was expanded to gather data on the age and the race/ethnicity of the faculty in addition to the data collected annually on rank, tenure status, and gender. The information on the four-year mathematics and statistics faculty derived from this data is presented in Chapters 1 and 4 of this report.

Using the faculty data collected by the 2010 Departmental Profile Survey reduced the size of the 2010 CBMS survey form. Furthermore, it eliminated the collection of the same faculty data on both surveys. In addition, coordination between the administrators of the Annual Survey and the CBMS survey allowed for minimizing the number of departments that were asked to complete both surveys.

Target Populations and Survey Approach

The procedures used to conduct the 2010 Departmental Profile survey are parallel to those used in CBMS 2010 as described in detail in Part I of this appendix. As with the CBMS 2010 survey, the primary characteristics used to stratify the departments for survey and reporting purposes are program type (four-year mathematics or four-year statistics) and the highest mathematical sciences degree offered by the department: doctoral, masters, or bachelors. The Departmental Profile survey employs a census of the doctoral mathematics departments whereas the CBMS survey samples these departments. In addition, the CBMS 2010 sample frame of statistics departments included twenty-four departments that offered at most a masters degree in statistics. These departments are not part of the regular Annual Survey sample frame but were included in the 2010 Departmental Profile survey. The Annual Survey reports separately on doctorate-granting departments of applied mathematics, but these departments are grouped with the doctoral departments of mathematics for the CBMS 2010 analysis. Finally, the Departmental Profile survey was sent to all masters-level mathematics departments and to double the number of bachelor-level departments: 267 compared to 134 for the CBMS survey.

Comparison of the Annual Survey Sample Frame with the CBMS Sample Frame

Table AS.1 demonstrates that the sample frames of four-year mathematics and statistics departments used in the two surveys closely align. As a consequence of this alignment, the distinction between the terms “Bachelors”, “Masters”, and “Doctoral” Mathematics Departments as defined in the two surveys is immaterial.

Table AS.1 Comparability of 2010 Annual Survey Sample Frame and the 2010 CBMS Sample Frame for Four-Year Mathematics Departments & Statistics Departments

Dept. Grouping	Annual Survey Count	CBMS Count	Overlap Count
Doctoral Math. Depts.	193	197	193
Masters Math. Depts.	180	181	177
Bachelors Math. Depts.	1012	1015	1011
Doctoral Stat. Depts.	54	55	54
Masters Stat. Depts.	22	24	22
Total	1461	1472	1457

Table AS.2 summarizes the stratifications used with the Departmental Profile and the allocation of the sample to the strata for the bachelors departments. This is the same stratification scheme used for CBMS 2010 and described in Part I of this appendix.

Survey Implementation

Departmental Profile forms were distributed in early January of 2011 asking departments to report on their fall-term 2010 faculty. Follow-up requests were sent to non-responding departments over the winter of 2011. The final effort to obtain responses took place during April in the form of phone calls to non-responding departments. The final efforts were concentrated on the strata with the lowest response rates.

Data Analysis

The data analysis used with the 2010 Departmental Profile survey parallels that used for CBMS 2010. The only notable variation is that if a non-responding department had completed a Departmental Profile survey within the previous three years, data from that survey was used to replace as much of the missing data for fall 2010 as feasible. This previously reported data consisted of the department's counts of faculty by rank, tenure-status, and gender. This technique was not possible for the fall 2010 data on faculty age and race/ethnicity since this information is not a part of previous Departmental Profile surveys.

The use of a department's prior-year faculty data to replace missing data for fall 2010 is supported by an ongoing review of annual faculty data from departments responding to the Departmental Profile in multiple years. Analysis of these data series demonstrates that the year-to-year variations in a given department's faculty data are, in general, much smaller than the department's deviation from the means for that department's stratum. Since the technique used to estimate the total for a stratum is equivalent to replacing the missing data with the average for the responding departments in that stratum, using prior responses is likely to produce a more accurate estimate of the total.

Table AS.2 lists the final sample weights used to produce the estimates within each stratum of the counts of faculty by rank, type of appointment, and gender. The column "Response rate" reflects the sum of the forms returned and the responses from prior years, when available. The sample weights used to produce estimates of age distribution and race/ethnicity distributions are higher in some strata since responses to those items were not available for prior years.

The standard errors reported for the faculty data are computed using the formulas described on pages 83-84 and 97-98 of [SMO].

Table AS.2 Stratum designations and allocations and nonresponse adjusted sample weights used with Annual Survey Data analyzed for CBMS 2010 report.

Stratum	Program Type	Highest Degree	Universe (N)	Number selected (n)	Sampling Rate (n/N)	Raw Sampling Weights (N/n)	Number of Responses	Number prior-year responses	Response rate	Nonresponse adjusted factor	Final sampling weights
1	4-year Math	PhD	48	48	1.000	1.000	42	3	0.938	1.067	1.067
2			54	54	1.000	1.000	46	6	0.963	1.038	1.038
3			43	43	1.000	1.000	40	3	1.000	1.000	1.000
4			24	24	1.000	1.000	22	1	0.958	1.043	1.043
5			18	18	1.000	1.000	15	2	0.944	1.059	1.059
6			6	6	1.000	1.000	6	0	1.000	1.000	1.000
7		MA	84	84	1.000	1.000	37	18	0.655	1.527	1.527
8			52	52	1.000	1.000	29	12	0.788	1.268	1.268
9			23	23	1.000	1.000	16	4	0.870	1.150	1.150
10			21	21	1.000	1.000	13	4	0.810	1.235	1.235
11		BA	191	35	0.183	5.457	8	2	0.286	3.500	19.100
12			201	35	0.174	5.743	14	3	0.486	2.059	11.824
13			270	50	0.185	5.400	19	5	0.480	2.083	11.250
14			244	85	0.348	2.871	37	11	0.565	1.771	5.083
15			106	62	0.585	1.710	37	15	0.839	1.192	2.038
16	4-year Stat	PhD	17	17	1.000	1.000	12	3	0.882	1.133	1.133
17			23	23	1.000	1.000	18	3	0.913	1.095	1.095
18			10	10	1.000	1.000	6	3	0.900	1.111	1.111
19			4	4	1.000	1.000	4	0	1.000	1.000	1.000
20		MA	22	22	1.000	1.000	10	0	0.455	2.200	2.200

Appendix III

List of Responders to the Survey

Two-Year Respondents

Aiken Technical College
Mathematics & Science

American River College
Mathematics

Arkansas State University-Beebe
Mathematics & Science

Austin Community College District
Mathematics

Bakersfield College
Mathematics

Bristol Community College
Mathematics

Cape Fear Community College
Mathematics & Physical Education

Catawba Valley Community College
Mathematics

Central Carolina Community College
Mathematics & Sciences

Central Carolina Technical College
Mathematics

Central Florida Community College-Ocala
Mathematics & Sciences

Central Wyoming College
Mathematics

Cerritos College
Mathematics

Chipola College
Mathematics, Natural Sciences, & Education

Coastal Carolina Community College
Mathematics & Science

Coconino County Community College
Mathematics & Science

College of Southern Idaho
Mathematics

Columbus State Community College
Mathematics

Community College of Allegheny County
Mathematics

Copiah-Lincoln Community College
Mathematics & Computer Science

Cuyahoga Community College District
Mathematics

Delaware Technical and Community College-Stanton-Wilmington
Mathematics & Physics

Eastern Iowa Community College District
Mathematics

Edison State Community College
Mathematics

El Camino College
Mathematical Sciences

Erie Community College
Mathematics & Computer Science

Finger Lakes Community College
Mathematics

Fond du Lac Tribal and Community College
Mathematics

Georgia Perimeter College
Mathematics & Science

Gulf Coast Community College
Mathematics

Harrisburg Area Community College-Harrisburg Campus
Mathematics & Computer Science

Hillsborough Community College
Mathematics

Howard College
Mathematics & Science

Hudson County Community College
Health, Science, & Technology

Ivy Tech Community College-Central Indiana
Mathematics

Ivy Tech Community College-Lafayette
Mathematics

James H. Faulkner State Community College
Mathematics & Pre-engineering

Kennebec Valley Community College
Mathematics

Kent State University at Stark
Mathematics

Leeward Community College
Mathematics & Natural Science

Linn-Benton Community College-Albany Campus
Mathematics

Lone Star College-Montgomery
Mathematics

Lone Star College-North Harris
Mathematics

Massachusetts Bay Community College
Mathematics & Science

Mercer County Community College
Mathematics

Middlesex County College
Mathematics

Milwaukee Area Technical College
Mathematics

Monroe Community College
Mathematics

Montgomery College
Mathematics

Moraine Valley Community College
Mathematics

Murray State College
Science & Mathematics

Muskegon Community College
Mathematics & Physical Sciences

Niagara County Community College
Mathematics, Physics, & Computer and Information Sciences

North Lake College
Mathematics, Science, & Sports Science

North Shore Community College
Mathematics

Northeast Community College
Mathematics

Northeast Mississippi Community College
Mathematics & Sciences

Northeast Texas Community College
Mathematics

Northland Community and Technical College
Mathematics

Northwest Kansas Technical College
Mathematics

Northwest Mississippi Community College
Mathematics

Oakland Community College
Mathematics

Onondaga Community College
Mathematics

Otero Junior College
Science & Mathematics

Pasadena City College
Mathematics

Pellissippi State Technical Community College
Mathematics

Pierpont Community and Technical College
Academic Studies

Portland Community College
Mathematics

Pratt Community College
Mathematics

Richland College
Mathematics

Riverside Community College
Mathematics

Rock Valley College
Mathematics

Rockland Community College
Mathematics

Rogue Community College
Mathematics

Saint Louis Community College-Florissant Valley
Mathematics

Salt Lake Community College
Mathematics

San Jacinto Community College
Mathematics

Santa Monica College
Mathematics

Seattle Community College-Central Campus
Science & Mathematics

Seward County Community College and Area Technical School
Mathematics, Science, & HPERD

Sierra College
Mathematics

Snead State Community College
Mathematics

Solano Community College
Mathematics & Science

South Louisiana Community College
Mathematics

Southeast Campus
Science & Mathematics

Southern Arkansas University Tech
Arts & Sciences

Southwestern College
Mathematics

Southwestern Illinois College
Mathematics & Computer Science

St. Johns River State College
Mathematics

SUNY College of Technology at Alfred
Mathematics & Physics

Surry Community College
Mathematics

Thaddeus Stevens College of Technology
General Education

Trident Technical College
Mathematics

University of Alaska Fairbanks Community and Technical College
Developmental Education

University of South Carolina-Salkehatchie
Mathematics & Science

Valencia Community College West Campus
Mathematics

Vance-Granville Community College
Mathematics

Wabash Valley College
Mathematics

Washtenaw Community College
Mathematics

West Los Angeles College
Mathematics

Wilbur Wright College
Mathematics

Yavapai College
Science & Mathematics

Four-Year Mathematics Respondents

Andrews University
Mathematics

Appalachian State University
Mathematical Sciences

Arizona State University
Mathematical & Statistical Sciences

Arizona State University at West Campus
Mathematical & Natural Sciences

Armstrong Atlantic State University
Mathematics

Ashland University
Mathematics & Computer Science

Augusta State University
Mathematics & Computer Science

Aurora University
Computer & Natural Sciences

Bellevue University
Mathematics

Benedictine College
Mathematics & Computer Science

Bethel College
Mathematical Sciences

Binghamton University, State University of New York
Mathematics & Science

Bloomsburg University of Pennsylvania
Mathematics, Computer Science, & Statistics

Bob Jones University
Mathematical Science

Bowling Green State University
Mathematics & Statistics

Brigham Young University
Mathematics

Brigham Young University-Idaho
Mathematics

Brown University
Applied Mathematics

Bucknell University
Mathematics

Cabrini College
Mathematics

California Polytechnic State University
Mathematics

California State University, Bakersfield
Mathematics

California State University, Channel Islands
Mathematics

California State University, Dominguez Hills
Mathematics

California State University, San Bernadino
Mathematics

Carlow University
Mathematics

Cazenovia College
Mathematics & Chemistry

Central College
Mathematics & Computer Science

Chestnut Hill College
Mathematical Sciences

Clarion University of Pennsylvania
Mathematics

Clarke University
Mathematics

Clemson University
Mathematical Sciences

College of St. Mary
Mathematics

College of Staten Island, CUNY
Mathematics

Colorado School of Mines
Mathematics & Computer Science

Colorado State University
Mathematics

Columbus State University
Mathematics

Concordia University
Mathematics & Computer Science

Cornell University
Mathematics

Curry College
Natural Science & Mathematics

DePaul University
Mathematical Sciences

Doane College
Mathematics

Duke University
Mathematics

East Central University
Mathematics

East Stroudsburg University of Pennsylvania
Mathematics

Eastern Illinois University
Mathematics & Computer Science

Eastern Kentucky University
Mathematics & Statistics

Eastern New Mexico University
Mathematical Sciences

Elon University
Mathematics & Statistics

Emory University
Mathematics & Computer Science

Fairfield University
Mathematics & Computer Science

Ferris State University
Mathematics

Florida Atlantic University
Mathematical Sciences

Florida Gulf Coast
Chemistry & Mathematics

Florida Institute of Technology
Mathematical Sciences

Florida State University
Mathematics

Fordham University
Mathematics

Fort Lewis College
Mathematics

Fort Hays State University
Mathematics & Computer Science

Franciscan University of Steubenville
Mathematics & Computer Science

Franklin University
Mathematics

Furman University
Mathematics

George Mason University
Mathematical Sciences

Georgia Institute of Technology
Mathematics

Georgia Southern University
Mathematical Sciences

Georgia Southwestern State University
Mathematics

Gettysburg College
Mathematics

Green Mountain College
Mathematics

Hamilton College
Mathematics

Hawaii Pacific University
Mathematics

Henderson State University
Mathematics & Computer Science

Holy Family University
Natural Science & Mathematics

Illinois College
Mathematics

Illinois Institute of Technology
Applied Mathematics

Illinois State University
Mathematics

Indiana University, Bloomington
Mathematics

Indiana University of Pennsylvania
Mathematics

Indiana University-Purdue University Indianapolis
Mathematical Sciences

Indiana University, South Bend
Mathematical Sciences

Iona College
Mathematics

Iowa Wesleyan College
Mathematics & Computer Science

Ithaca College
Mathematics

Kent State University, Kent
Mathematical Sciences

Le Tourneau University
Mathematics

LeMoyne College
Mathematics & Computer Science

Lenoir-Rhyne University
Mathematics & Computing Sciences

Lincoln University
Computer Science, Technology, & Mathematics

Loyola University
Mathematical Sciences

Marlboro College
Mathematics

Marquette University
Mathematics, Statistics, & Computer Science

Massachusetts College of Pharmacy
Arts & Sciences

Mercer University
Mathematics

Minnesota State University, Mankato
Mathematics & Statistics

Misericordia University
Mathematics

Missouri University of Science & Technology
Mathematics & Statistics

Monmouth College
Mathematics & Computer Science

Montana State University
Mathematical Sciences

Montclair State University
Mathematical Sciences

New Jersey City University
Mathematics

New York University
Mathematics

North Carolina Agricultural & Technical State University
Mathematics

North Carolina Central University
Mathematics & Computer Science

North Dakota State University, Fargo
Mathematics

Northern Kentucky University
Mathematics & Statistics

Northwest Missouri State University
Mathematics & Statistics

Northwestern University
Engineering Science & Applied Mathematics

Northwestern University
Mathematics

Ohio State University, Columbus
Mathematics

Ohio University, Athens
Mathematics

Oklahoma State University
Mathematics

Old Dominion University
Mathematics & Statistics

Palm Beach Atlantic University
Mathematics & Computer Science

Pennsylvania State University
Mathematics

Pennsylvania State University, Erie, Behrend College
Science

Pennsylvania State University, Wilkes-Barre
Mathematics

Pfeiffer University
Mathematics

Pittsburg State University
Mathematics

Polytechnic Institute of New York University
Mathematics

Portland State University
Mathematics & Statistics

Rensselaer Polytechnic Institute
Mathematical Sciences

Rice University
Mathematics

Richard Stockton College
Mathematics

Rider University
Mathematics

Rutgers The State University of New Jersey
Mathematics

Salisbury University
Mathematics & Computer Science

San Jose State University
Mathematics

Seattle Pacific University
Mathematics

Slippery Rock University of Pennsylvania
Mathematics

South Dakota School of Mines & Technology
Mathematics & Computer Science

South Dakota State University
Mathematics & Statistics

Southeast Missouri State University
Mathematics

Southern Connecticut State University
Mathematics

Southern Illinois University, Carbondale
Mathematics

Southern Methodist University
Mathematics

Southern Nazarene University
Mathematics

Southern Polytechnic State University
Mathematics

Southern University, Baton Rouge
Mathematics

Springfield College
Mathematics, Physics, & Computer Science

State University of New York at Buffalo
Mathematics

State University of New York at Stony Brook
Applied Mathematics & Statistics

SUNY at Potsdam
Mathematics

SUNY, College at Cortland
Mathematics

SUNY, Purchase College
Mathematics & Computer Science

Temple University
Mathematics

Tennessee Wesleyan College
Mathematics

Texas A&M University
Mathematics

Texas A&M University-Corpus Christi
Mathematics & Statistics

Texas Christian University
Mathematics

Texas State University-San Marcos
Mathematics

Texas Tech University
Mathematics & Statistics

Tufts University
Mathematics

University of Akron
Mathematics

University of Alabama-Huntsville
Mathematics

University of Alaska Fairbanks
Mathematics & Statistics

University of Arizona
Mathematics

University of California, Berkeley
Mathematics

University of California, Los Angeles
Mathematics

University of California, Riverside
Mathematics

University of California, Santa Barbara
Mathematics

University of Central Florida
Mathematics

University of Colorado, Boulder
Applied Mathematics

University of Colorado, Boulder
Mathematics

University of Dallas
Mathematics

University of Dayton
Mathematics

University of Florida
Mathematics

University of Georgia
Mathematics

University of Hawaii at Manoa
Mathematics

University of Houston
Mathematics

University of Houston-Downtown
Computer & Mathematical Sciences

University of Illinois at Chicago
Mathematics, Statistics, & Computer Science

University of Illinois, Urbana-Champaign
Mathematics

University of Iowa
Mathematics

University of Louisiana at Lafayette
Mathematics

University of Louisville
Mathematics

University of Maryland, College Park
Mathematics

University of Miami
Mathematics

University of Michigan
Mathematics

University of Minnesota-Crookston
Mathematics

University of Missouri-St. Louis
Mathematics & Computer Science

University of Nebraska-Lincoln
Mathematics

University of Nevada, Reno
Mathematics & Statistics

University of New Hampshire
Mathematics & Statistics

University of North Alabama
Mathematics & Computer Science

University of North Carolina at Charlotte
Mathematics & Statistics

University of North Carolina at Greensboro
Mathematics & Statistics

University of North Dakota
Mathematics

University of North Florida
Mathematics & Statistics

University of Northern Iowa
Mathematics

University of Notre Dame
Mathematics

University of Oklahoma
Mathematics

University of Pittsburgh
Mathematics

University of Pittsburgh at Greensburg
Natural Sciences, Mathematics, & Engineering

University of Puget Sound
Mathematics & Computer Science

University of Redlands
Mathematics & Computer Science

University of Rhode Island
Mathematics

University of Richmond
Mathematics & Computer Science

University of Rochester
Mathematics

University of South Carolina
Mathematics

University of South Dakota
Mathematical Science

University of South Florida
Mathematics & Statistics

University of Southern Indiana
Mathematics

University of Southern Mississippi
Mathematics

University of St. Francis
Mathematics

University of Tennessee, Knoxville
Mathematics

University of Texas at Arlington
Mathematics

University of Texas at El Paso
Mathematical Science

University of the Incarnate Word
Mathematics, Science, & Engineering

University of Washington
Mathematics

University of Wisconsin, Eau Claire
Mathematics

University of Wisconsin, Madison
Mathematics

University of Wisconsin, Stout
Mathematics, Statistics, & Computer Science

Valdosta State University
Mathematics & Computer Science

Valparaiso State University
Mathematics & Computer Science

Walsh University
Mathematics

Washburn University of Topeka
Mathematics & Statistics

Washington State University
Mathematics

Washington University
Mathematics

Wayne State University
Mathematics

Webster University
Mathematics & Computer Science

West Texas A&M University
Mathematics, Chemistry, & Physics

West Virginia State University
Mathematics

West Virginia Wesleyan College
Mathematics & Computer Science

Western Carolina University
Mathematics & Computer Science

Wichita State University
Mathematics & Statistics

Widener University
Mathematics

Wilkes University
Mathematics & Computer Science

William Paterson University
Mathematics

Winston-Salem State University
Computer Science

Wittenberg University
Mathematics & Computer Science

Wright State University, Dayton
Mathematics & Statistics

Four-Year Statistics Respondents

Bowling Green State University
Applied Statistics & Operations Research

Brigham Young University
Statistics

California Polytechnic State University
Statistics

California State University, East Bay
Statistics & Biostatistics

Carnegie Mellon University
Statistics

Case Western Reserve University
Statistics

Columbia University
Statistics

Duke University
Statistical Science

Florida State University
Statistics

George Mason University
Statistics

George Washington University
Statistics

Grand Valley State University
Statistics

Harvard University
Statistics

Indiana University, Bloomington
Statistics

Iowa State University
Statistics

Kansas State University
Statistics

Michigan State University
Statistics & Probability

Northwestern University
Statistics

Ohio State University, Columbus
Statistics

Pennsylvania State University, University Park
Statistics

Purdue University
Statistics

Rice University
Statistics

Rochester Institute of Technology
Mathematical Sciences

Southern Methodist University
Statistical Science

St. Cloud State University
Statistics & Computer Networking

Temple University
Statistics

Texas A&M University
Statistics

University of Akron
Statistics

University of California, Davis
Statistics

University of California, Irvine
Statistics

University of California, Los Angeles
Statistics

University of California, Santa Barbara
Statistics & Applied Probability

University of Connecticut, Storrs
Statistics

University of Florida
Statistics

University of Georgia
Statistics

University of Illinois, Urbana-Champaign
Statistics

University of Iowa
Statistics & Actuarial Science

University of Kentucky
Statistics

University of Minnesota-Twin Cities
Statistics

University of Missouri-Columbia
Statistics

University of Nebraska-Lincoln
Statistics

University of North Carolina at Chapel Hill
Statistics & Operations Research

University of Pennsylvania
Statistics

University of Pittsburgh
Statistics

University of Tennessee
Statistics, Operations, & Management Science

University of Virginia
Statistics

University of Washington
Statistics

University of Wisconsin, Madison
Statistics

University of Wyoming
Statistics

Virginia Commonwealth University
Statistical Sciences & Operations Research

Virginia Polytechnic Institute and State University
Statistics

Washington State University
Statistics

Yale University
Statistics

Appendix IV

Four-Year Mathematics Questionnaire

FOUR-YEAR QUESTIONNAIRE

CBMS2010

CONFERENCE BOARD OF THE MATHEMATICAL SCIENCES

SURVEY OF UNDERGRADUATE PROGRAMS IN THE MATHEMATICAL SCIENCES

General Information

As part of a random sample, your department has been chosen to participate in the NSF-funded CBMS2010 National Survey of Undergraduate Mathematical Sciences Programs. Even though it is a very complicated survey, the presidents of all U.S. mathematical sciences organizations have endorsed it and ask for your cooperation.

We assure you that no individual departmental data, except the names of responding departments, will be released.

This survey provides data about the nation's undergraduate mathematical and statistical effort that is available from no other source. You can see the results of a similar survey fielded five years ago by going to www.ams.org/cbms, where the CBMS 2005 report is available online.

All departments in this survey are in universities and colleges that offer at least a bachelor's degree. They may or may not offer a major in mathematics. Many of the departments in our random sample also offer higher degrees in mathematical sciences.

We have classified your department as belonging to a university or four-year college. If this is not correct, please contact Ellen Kirkman, Survey Director, at 336-758-5351 or at Kirkman@wfu.edu.

Please report on undergraduate programs in the broadly defined mathematical sciences (including applied mathematics, statistics, operations research, and computer science) that are under the direction of your department. Do not include data for other departments or for branches or campuses of your institution that are budgetarily separate from your own. Also, if your department is broader than just mathematics (e.g., Division of Mathematics and Sciences), please report only on the mathematics courses (as broadly defined here).

This survey may be completed either online or using a hard-copy questionnaire. We recommend using the online system because it will do some of the work for you; e.g., it will automatically skip those questions that are not applicable (based on the response you give), gray out portions of questions that do not apply, remind you of previous responses, and provide definitions when you let your cursor hover certain highlighted words.

If you have any questions while filling out this survey form, please call the Survey Director, Ellen Kirkman, at 336-758-5351 or contact her by e-mail at Kirkman@wfu.edu. For help with the online questionnaire, call Westat at 888-248-5017 or send an email to cbms@westat.com.

Please complete the questionnaire by November 9, 2010, either online or by mailing a hard copy to:

CBMS Survey
Westat
1600 Research Boulevard
Rockville, MD 20850-3129

Please retain a copy of your responses to this questionnaire in case questions arise.

A. General Information

Mathematics Questionnaire

A1. Name of your institution: ______________________________

A2. Name of your department: ______________________________

A3. We have classified your department as being part of a university or four-year college. Do you agree?

Yes .... ☐ → If Yes, go to A4 below.

No .... ☐ → If No, please call Ellen Kirkman, Survey Director, at 336-758-5351.

A4. If your college or university does not recognize tenure, check this box. ☐

A5. Contact person in your department: [ ]

A6. Contact person's e-mail address: [ ]

A7. Contact person's phone number including area code: [(   )]

A8. Contact person's mailing address:

a. Street............................. [ ]

b. Street2........................... [ ]

c. City .... [ ]

d. State... [ ]

e. Zip code .... [ ]

B. Dual Enrollment Courses

Mathematics Questionnaire

B1. We use the term dual enrollment courses to refer to courses conducted on a high school campus and taught by high school teachers, for which high school students may obtain high school credit and, simultaneously, college credit through your institution. Does your department participate in any dual enrollment programs of this type?

Yes................ ☐ ⟶ If Yes, go to B2.

No .... ☐ ⟶ If No, go to B6.

B2. Please complete the following table concerning your dual enrollment program (as defined above) for the previous term (spring 2010) and the current fall term of 2010.

Course	Total Dual Enrollments	
	Last Term= Spring 2010	This Term= Fall 2010
a. College Algebra..........		
b. Pre-calculus		
c. Calculus I		
d. Statistics....................		
e. Other		

B3. For the dual enrollment courses in B2, to what extent are the following the responsibility of your department? *(Choose one on each line.)*

	Never Our Responsibility	Sometimes Our Responsibility	Always Our Responsibility
a. Choice of textbook......................	☐	☐	☐
b. Design/approval of syllabus.........	☐	☐	☐
c. Design of final exam....................	☐	☐	☐
d. Choice of instructor.....................	☐	☐	☐

B4. Does your department have a teaching evaluation program in which your part-time department faculty are required to participate?

Yes................ ☐ ⟶ If Yes, go to B5.

No .... ☐ ⟶ If No, go to B6.

B5. Are instructors in the dual enrollment courses reported in B2 required to participate in the teaching evaluation program for part-time departmental faculty described in B4?

Yes.................. ☐

No.................... ☐

B. Dual Enrollment Courses (continued)

Mathematics Questionnaire

B6. Does your department assign any of its own full-time or part-time faculty to teach courses conducted on a high school campus for which high school students may receive both high school and college credit (through your institution)?

Yes .... ☐ → If Yes, go to B7.

No .... ☐ → If No, go to Section C.

B7. How many students are enrolled in the courses conducted on a high school campus and taught by your full-time or part-time faculty and through which high school students may receive both high school and college credit (through your institution)?

Number of students............................. ☐

In subsequent sections we ask about course enrollments in your department; please ***do not*** *include any of the enrollments reported in this Section B.*

C. Distance Learning

Mathematics Questionnaire

Definition: Distance learning courses are those courses in which the majority of the instruction occurs with the instructor and the students separated by time and /or place (e.g. courses in which the majority of the course is taught online, or by computer software, by television, or by correspondence).

C1. Does your department offer distance learning courses?

Yes .... ☐

No .... ☐ ⟶ If No, skip to D1.

C2. Which best characterizes the format/structure of the majority of your distance learning courses?

All instruction is conducted without an instructor being physically present .... ☐
Some instruction is conducted with an instructor being physically present....... ☐

C3. Which one response best describes the general pattern for how the instructional materials used in your distance learning courses are determined?

Course instructors create materials... ☐
Course instructors choose commercially produced materials........ ☐
Course instructors choose a combination of both......................... ☐

C4. In most of your distance learning courses, how are the majority of the tests administered? (Choose one response.)

Not at a monitored testing site (e.g., online or by correspondence).......... ☐
At a monitored testing site.. ☐
Combination of both.. ☐

C5. Does your institution give mathematics credit for distance learning courses that are not offered through your department?

Yes................................ ☐

No .... ☐

No department policy...... ☐

C. Distance Learning (continued)

Mathematics Questionnaire

C6. Are there any courses that you offer in both non-distance learning and in distance learning formats?

Yes................ ☐ ⟶ If Yes, go to C7 below.

No .... ☐ ⟶ If No, go to D1.

C7. Are the content, goals, and objectives of the distance learning courses generally the same as those in the non-distance learning courses of the same title?

Yes.. ☐

No .... ☐

C8. Do the course instructors in your distance learning courses generally:

	Yes	No
a. Hold office hours to meet with students on campus as in comparable non-distance learning courses taught on campus?..	☐	☐
b. Participate in evaluation of instruction in the same way as faculty who teach comparable non-distance learning courses?...	☐	☐

C9. Which, if any, of the following practices apply to the majority of distance learning courses in your department? Check one response on each line.

	Yes	No
a. Same use of common examinations (if any) as in the non-distance learning courses	☐	☐
b. Same common course outlines as in the non-distance learning course	☐	☐
c. Same course projects as in the non-distance learning course...	☐	☐

D. Faculty Profile (Fall 2010)

Please indicate whether the following types of faculty are actively teaching one or more courses in fall 2010.

Definitions

- **Full-time faculty.** Faculty who are full-time employees in the institution and more than half-time in the department. For example, if a tenured physics professor with a joint appointment in your department teaches a total of two courses in fall 2010, with exactly one being in your department (i.e., mathematics is 50% of the fall teaching assignment) , then that person would be counted as part-time in your department.
- **Permanent faculty.** If your institution does not recognize tenure, please report full-time departmental faculty who are permanent on line D1a and report all other faculty on the remaining lines as appropriate.

Faculty Type	**Teach in Fall 2010**	
	Yes	**No**
D1. Full-time faculty		
a. Tenured, tenure-eligible, or permanent faculty................	☐	☐
b. Other full-time faculty...	☐	☐
D2. Part-time faculty	☐	☐
D3. Graduate teaching assistant(s) who teach courses independently (not counting the teaching of recitation sessions)..	☐	☐

E. Mathematics Courses (Fall 2010)

In the next several pages you will enter data about courses you are teaching. For each course that is taught, you will be asked to enter the fall 2010 enrollment and the number of sections of the course. Depending upon the type of course, you will be asked about distance learning enrollment and the numbers of each kind of faculty (tenure eligible, part time, etc.) who are teaching the course. Also, you may not teach some of your advanced courses in every term; for those courses we also ask whether the course was offered in spring 2010 or will be offered in spring 2011 (please combine the winter and spring terms if your institution uses the quarter system); please answer these questions regardless of whether you offer the courses in fall 2010.

The following instructions apply throughout Sections E, F, and G (pages 8-23).

- Report distance learning enrollments separately from other enrollments. A *distance learning* course is one in which the majority of instruction occurs with the instructor and the students separated by time and place (e.g., courses in which the majority of the course is taught online or by computer software or correspondence).
- Do NOT include any dual enrollment sections or enrollments in these tables. (In this questionnaire, a *dual enrollment* section is one that is conducted on a high school campus, taught by a high school teacher, and allows students to receive high school credit and, simultaneously, college credit from your institution for the course. These courses were reported in Section B.)
- For Calculus and Introductory Statistics classes, you will be asked to list separately classes taught in a large lecture format (with recitation sections) and classes taught by a single instructor (these classes are further broken down by enrollment of 30 or less and enrollment over 30). For example, for Mainstream Calculus I, you will be asked for both the number of large lecture courses (E12-1 column (c)) and the total number of recitation sections for all the large lectures (E12-2 column (c)). For all courses except as marked in E12, E13, E14, E15, F1, and F2, please do not treat recitation sessions as separate sections. Instead, please treat both the lecture component and any associated recitation sessions as a single section.
- Report a section of a course as being taught by a *graduate teaching assistant (GTA)* if and only if that section is taught *independently* by the GTA, i.e., when it is the GTA's own course and the GTA is the instructor of record.
- If your institution does not recognize tenure, report sections taught by your permanent full-time faculty in column (d) and sections taught by other full-time faculty in column (e).
- Full-time faculty teaching in your department and holding joint appointments with other departments should be counted in column (d) if they are tenured, tenure-eligible, or permanent in your department. Faculty who are not tenured, tenure-eligible, or permanent in your department should be counted in column (f) if their fall 2010 teaching in your department is less than or equal to 50% of their total fall teaching assignment, and they should be reported in column (e) otherwise. (Example: If a tenured physics professor with a joint appointment in your department teaches a total of two courses in fall 2010, with exactly one being in your department and hence mathematics comprised 50% of the fall teaching assignment, then that person would be counted as part-time in your department.)
- Do not fill in any shaded boxes.
- Any unshaded box that is left blank will be interpreted as reporting a count of zero.
- Except where specifically stated to the contrary, the tables in Sections E, F, and G deal with enrollments in fall term 2010.
- If a section is co-taught by multiple faculty, categorize the section in terms of the most senior faculty member teaching that course.

E. Mathematics Courses (Fall 2010) cont.

Mathematics Questionnaire

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corresponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time Faculty[3]: Tenured, Tenure-eligible, or Permanent Faculty (d)	Full-time Faculty[3]: Other Full-time Faculty (e)	Part-time Faculty (f)	Graduate Teaching Assistants[4] (g)
MATHEMATICS							
PRECOLLEGE LEVEL							
E1. Precollege level (e.g., arithmetic, pre-algebra, elementary algebra, intermediate algebra)							
INTRODUCTORY LEVEL, INCLUDING PRE-CALCULUS							
E2. Mathematics for Liberal Arts							
E3. Finite Mathematics							
E4. Business Mathematics (non-Calculus)							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.
[3] Count faculty with joint appointments in column (d) or (e) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.
[4] Sections taught independently by GTAs .

E. Mathematics Courses (Fall 2010) (continued)

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corresponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time Faculty[3] Tenured, Tenure-eligible, or Permanent Faculty (d)	Full-time Faculty[3] Other Full-time Faculty (e)	Part-time Faculty (f)	Graduate Teaching Assistants[4] (g)
MATHEMATICS							
INTRODUCTORY LEVEL, INCLUDING PRE-CALCULUS, CONT.							
E5. Mathematics for pre-service K-8 School Teachers (all courses)							
E6. College Algebra (not included in the Precollege E1 above)							
E7. Trigonometry							
E8. College Algebra & Trigonometry (combined)							
E9. Elementary Functions, Pre-calculus, Analytic Geometry							
E10. Introduction to Mathematical Modeling							
E11. All other introductory-level non-Calculus courses							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.
[3] Count faculty with joint appointments in column (d) or (e) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.
[4] Sections taught independently by GTAs .

E. Mathematics Courses (Fall 2010) (continued)

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time Faculty[3] Tenured, Tenure-eligible, or Permanent Faculty (d)	Other Full-time Faculty (e)	Part-time Faculty (f)	Graduate Teaching Assistants[4] (g)
MATHEMATICS							
MAINSTREAM[5] CALCULUS I							
E12-1. Lecture with separately scheduled recitation/problem/laboratory sessions[6]							
E12-2. Number of recitation/problem/laboratory sessions associated with courses reported in E12-1. See example [7] below.							
E12-3. Sections not in E12-1 with enrollments of 30 or less							
E12-4. Sections not in E12-1 with enrollments above 30							
MAINSTREAM[5] CALCULUS II							
E13-1. Lecture with separately scheduled recitation/problem/laboratory sessions[6]							
E13-2. Number of recitation/problem/ laboratory sessions associated with courses reported in E13-1. See example [7] below.							
E13-3. Sections not in E13-1 with enrollments of 30 or less							
E13-4. Sections not in E13-1 with enrollments above 30							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.
[3] Count faculty with joint appointments in column (d) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.
[4] Sections taught independently by GTAs .
[5] A calculus course is mainstream if it leads to the usual upper division mathematical sciences courses.
[6] Report a calculus class along with its recitation/problem/laboratory sessions as one section in column (c) of E12-1, E13-1, E14-1, and E15-1.
[7] Example: suppose your department offers four 100-student sections of a course and that each is divided into five 20-student discussion sessions that meet separately from the lectures. Report 4*5=20 recitation/problem/laboratory sessions associated with the course, even if each discussion meets several times per week.

E. Mathematics Courses (Fall 2010) (continued)

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time Faculty[3] Tenured, Tenure-eligible, or Permanent Faculty (d)	Full-time Faculty[3] Other Full-time Faculty (e)	Part-time Faculty (f)	Graduate Teaching Assistants[4] (g)
MATHEMATICS							
MAINSTREAM[5] CALCULUS III (and **IV**, etc.)							
E14-1. Lecture with separately scheduled recitation/problem/laboratory sessions[6]							
E14-2. Number of recitation/problem/laboratory sessions associated with courses reported in E14-1. See example [7] below.							
E14-3. Sections not in E14-1 with enrollments of 30 or less							
E14-4. Sections not in E14-1 with enrollments above 30							
NON-MAINSTREAM[5] CALCULUS I							
E15-1. Lecture with separately scheduled recitation/problem/laboratory sessions[6]							
E15-2. Number of recitation/problem/laboratory sessions associated with courses reported in E15-1. See example[7] below.							
E15-3. Sections not in E15-1 with enrollments of 30 or less							
E15-4. Sections not in E15-1 with enrollments above 30							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.
[3] Count faculty with joint appointments in column (d) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.
[4] Sections taught independently by GTAs .
[5] A calculus course is mainstream if it leads to the usual upper division mathematical sciences courses.
[6] Report a calculus class along with its recitation/problem/laboratory sessions as one section in column (c) of E12-1, E13-1, E14-1, and E15-1.
[7] Example: suppose your department offers four 100-student sections of a course and that each is divided into five 20-student discussion sessions that meet separately from the lectures. Report 4*5=20 recitation/problem/laboratory sessions associated with the course, even if each discussion meets several times per week.

E. Mathematics Courses (Fall 2010) (continued)

Mathematics Questionnaire

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time Faculty[3] Tenured, Tenure-eligible, or Permanent Faculty (d)	Full-time Faculty[3] Other Full-time Faculty (e)	Part-time Faculty (f)	Graduate Teaching Assistants[4] (g)
MATHEMATICS							
CALCULUS LEVEL, CONT.							
E16. Non-mainstream[5] Calculus I, II, III, etc.							
E17. Differential Equations and Linear Algebra (combined)							
E18. Differential Equations							
E19. Linear Algebra or Matrix Theory							
E20. Discrete Mathematics							
E21. Other calculus-level courses							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.

[2] Do not include any dual enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.

[3] Count faculty with joint appointments in column (d) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.

[4] Sections taught independently by GTAs .

[5] A calculus course is mainstream if it leads to the usual upper division mathematical sciences courses.

E. Mathematics Courses (Fall 2010) (continued)

In reporting on advanced courses, please pay special attention to the following instructions:

- If an undergraduate course contains a mixture of graduate and undergraduate students, report them all in column (a).
- If your institution does not recognize tenure, report sections taught by your permanent faculty in column (c).
- Make sure that no course is reported in more than one row.
- Respond to columns (d) and (e) for every course, even if the course is not offered in fall 2010.

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total enrollment fall 2010 (a)	Number of sections corresponding to column (a) (b)	Number of sections corresponding to column (b) taught by Tenured, Tenure-eligible, or Permanent Faculty (c)	Whether or not the course was offered in fall 2010: Was this course taught in ANY term of the previous academic year? (d)		Will this course be offered in the next term (spring 2011)? (e)	
MATHEMATICS							
ADVANCED UNDERGRADUATE LEVEL				Yes	No	Yes	No
E22. Introduction to Proofs				☐	☐	☐	☐
E23-1. Modern Algebra I				☐	☐	☐	☐
E23-2. Modern Algebra II				☐	☐	☐	☐
E24. Number Theory				☐	☐	☐	☐
E25. Combinatorics				☐	☐	☐	☐
E26. Actuarial Mathematics				☐	☐	☐	☐
E27. Logic/Foundations (not E22)				☐	☐	☐	☐
E28. Discrete Structures				☐	☐	☐	☐
E29. History of Mathematics				☐	☐	☐	☐
E30. Geometry				☐	☐	☐	☐

E. Mathematics Courses (Fall 2010) (continued)

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total enrollment fall 2010 (a)	Number of sections corresponding to column (a) (b)	Number of sections corresponding to column (b) taught by Tenured, Tenure-eligible, or Permanent Faculty (c)	Whether or not the course was offered in fall 2010: Was this course taught in ANY term of the previous academic year? (d)		Will this course be offered in the next term (spring 2011)? (e)	
MATHEMATICS							
ADVANCED UNDERGRADUATE LEVEL, CONT.				Yes	No	Yes	No
E31-1. Advanced Calculus I and/or Real Analysis I				☐	☐	☐	☐
E31-2. Advanced Calculus II and/or Real Analysis II				☐	☐	☐	☐
E32. Advanced Mathematics for Engineering and Physical Sciences (all courses)				☐	☐	☐	☐
E33. Advanced Linear Algebra (beyond E17, E19)				☐	☐	☐	☐
E34. Vector Analysis				☐	☐	☐	☐
E35. Advanced Differential Equations (beyond E18)				☐	☐	☐	☐
E36. Partial Differential Equations				☐	☐	☐	☐
E37. Numerical Analysis I and II				☐	☐	☐	☐
E38. Applied Mathematics (Modeling)				☐	☐	☐	☐

E. Mathematics Courses (Fall 2010) (continued)

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total enrollment fall 2010 (a)	Number of sections corresponding to column (a) (b)	Number of sections corresponding to column (b) taught by Tenured, Tenure-eligible, or Permanent Faculty (c)	Whether or not the course was offered in fall 2010: Was this course taught in ANY term of the previous academic year? (d)		Will this course be offered in the next term (spring 2011)? (e)	
MATHEMATICS							
ADVANCED UNDERGRADUATE LEVEL, CONT.				Yes	No	Yes	No
E39. Complex Variables				☐	☐	☐	☐
E40. Topology				☐	☐	☐	☐
E41. Mathematics of Finance (not E26, E38)				☐	☐	☐	☐
E42. Codes and Cryptology				☐	☐	☐	☐
E43. Biomathematics				☐	☐	☐	☐
E44. Operations Research (all courses)				☐	☐	☐	☐
E45. Senior Seminar/ Independent Study in Mathematics				☐	☐	☐	☐
E46. All other advanced level mathematics (excluding Math for Secondary School Teachers, Probability or Statistics courses)							
E47. Mathematics for Secondary School Teachers (all such courses not counted above)				☐	☐	☐	☐

E48. Do you offer any advanced undergraduate mathematics courses (E22-E47) as distance learning courses?

Yes .... ☐ → If Yes, go to E49 below.

No .... ☐ → If No, go to Section F.

E49. Please indicate which advanced undergraduate mathematics courses you offer as distance learning courses. (Check all that apply.)

Course	Offer as distance learning
E22. Introduction to Proofs	☐
E23-1. Modern Algebra I	☐
E23-2. Modern Algebra II	☐
E24. Number Theory	☐
E25. Combinatorics	☐
E26. Actuarial Mathematics	☐
E27. Logic/Foundations (not E22)	☐
E28. Discrete Structures	☐
E29. History of Mathematics	☐
E30. Geometry	☐
E31-1. Advanced Calculus I and/or Real Analysis I	☐
E31-2. Advanced Calculus II and/or Real Analysis II	☐
E32. Advanced Mathematics for Engineering and Physical Sciences (all courses)	☐
E33. Advanced Linear Algebra (beyond E17, E19)	☐
E34. Vector Analysis	☐
E35. Advanced Differential Equations (beyond E18)	☐
E36. Partial Differential Equations	☐
E37. Numerical Analysis I and II	☐
E38. Applied Mathematics (Modeling)	☐
E39. Complex Variables	☐
E40. Topology	☐
E41. Mathematics of Finance (not E26, E38)	☐
E42. Codes and Cryptology	☐
E43. Biomathematics	☐
E44. Operations Research (all courses)	☐
E45. Senior Seminar/ Independent Study in Mathematics	☐
E46. Other advanced level mathematics (excluding Math for Secondary School Teachers, Probability or Statistics courses)	☐
E47. Mathematics for Secondary School Teachers (all such courses not counted above)	☐

F. Probability and Statistics Courses (Fall 2010)

F. Does your department offer any Probability and/or Statistics Courses?

Yes................. ☐ ⟶ If Yes, go to F1 below.

No .... ☐ ⟶ If No, go to Section G.

Please refer to the course reporting instructions at the beginning of Section E.

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time Faculty[3] Tenured, Tenure-eligible, or Permanent Faculty (d)	Full-time Faculty[3] Other Full-time Faculty (e)	Part-time Faculty (f)	Graduate Teaching Assistants[4] (g)
STATISTICS							
INTRODUCTORY LEVEL							
Introductory **Statistics (no calculus prerequisite)**							
F1-1. Lecture with separately scheduled recitation/problem/laboratory sessions[5]							
F1-2. Number of recitation/problem/ laboratory sessions associated with courses reported in F1-1[6]							
F1-3. Other sections with enrollment of 30 or less							
F1-4. Other sections with enrollment above 30							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.
[3] Count faculty with joint appointments in column (d) or (e) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.
[4] Sections taught independently by GTAs .
[5] Report an introductory statistics class along with its recitation/problem/laboratory sessions as one section in column (c) of F1 and F-2.
[6] Example: suppose your department offers four 100-student sections of a course and that each is divided into five 20-student discussion sessions that meet separately from the lectures. Report 4*5=20 recitation/problem/laboratory sessions associated with the course, even if each discussion meets several times per week.

Please refer to the course reporting instructions at the beginning of Section E.

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time Faculty[3] Tenured, Tenure-eligible, or Permanent Faculty (d)	Full-time Faculty[3] Other Full-time Faculty (e)	Part-time Faculty (f)	Graduate Teaching Assistants[4] (g)
STATISTICS							
INTRODUCTORY LEVEL							
Introductory Statistics (calculus prerequisite) (for non-majors)							
F2-1. Lecture with separately scheduled recitation/problem/laboratory sessions[5]							
F2-2. Number of recitation/problem/laboratory sessions associated with courses reported in F2-1[6]							
F2-3. Other sections with enrollment of 30 or less							
F2-4. Other sections with enrollment above 30							
Other Introductory Statistics Courses							
F3. Probability & Statistics (no calculus prerequisite)							
F4. Other elementary level Probability & Statistics courses							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.
[3] Count faculty with joint appointments in column (d) or (e) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.
[4] Sections taught independently by GTAs .
[5] Report an introductory statistics class along with its recitation/problem/laboratory sessions as one section in column (c) of F1 and F-2.
[6] Example: suppose your department offers four 100-student sections of a course and that each is divided into five 20-student discussion sessions that meet separately from the lectures. Report 4*5=20 recitation/problem/laboratory sessions associated with the course, even if each discussion meets several times per week.

F. Probability and Statistics Courses (Fall 2010) (continued)

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total enrollment fall 2010 (a)	Number of sections corresponding to column (a) (b)	Number of sections corresponding to column (b) taught by Tenured, Tenure-eligible, or Permanent Faculty (c)	Was this course taught in ANY term of the previous academic year? (d)		Will this course be offered in the next term (spring 2011)? (e)	
PROBABILITY & STATISTICS							
INTERMEDIATE AND ADVANCED LEVEL				Yes	No	Yes	No
F5. Mathematical Statistics (calculus prerequisite)				☐	☐	☐	☐
F6. Probability (calculus prerequisite)				☐	☐	☐	☐
F7. Combined Probability & Statistics (calculus prerequisite)				☐	☐	☐	☐
F8. Stochastic Processes				☐	☐	☐	☐
F9. Applied Statistical Analysis				☐	☐	☐	☐
F10. Design & Analysis of Experiments				☐	☐	☐	☐
F11. Regression (and Correlation)				☐	☐	☐	☐
F12. Biostatistics				☐	☐	☐	☐
F13. Nonparametric Statistics				☐	☐	☐	☐
F14. Categorical Data Analysis				☐	☐	☐	☐
F15. Sample Survey Design & Analysis				☐	☐	☐	☐
F16. Statistical Software & Computing				☐	☐	☐	☐
F17. Data Management				☐	☐	☐	☐
F18. Senior Seminar/ Independent Studies				☐	☐	☐	☐
F19. All other upper level Probability & Statistics							

F20. Do you offer any advanced undergraduate courses in statistics (F5-F19) as distance learning courses?

Yes .... ☐ → If Yes, go to F21 below.

No .... ☐ → If No, go to Section G.

F21. Please indicate which advanced undergraduate mathematics courses you offer as distance learning courses. (Check all that apply.)

Course		**Offer as distance learning**
F5.	Mathematical Statistics (calculus prerequisite)	☐
F6.	Probability (calculus prerequisite)	☐
F7.	Combined Probability & Statistics (calculus prerequisite)	☐
F8.	Stochastic Processes	☐
F9.	Applied Statistical Analysis	☐
F10.	Design & Analysis of Experiments	☐
F11.	Regression (and Correlation)	☐
F12.	Biostatistics	☐
F13.	Nonparametric Statistics	☐
F14.	Categorical Data Analysis	☐
F15.	Sample Survey Design & Analysis	☐
F16.	Statistical Software & Computing	☐
F17.	Data Management	☐
F18.	Senior Seminar/ Independent Studies	☐
F19.	Other upper level Probability & Statistics	☐

G. Does your department offer any Computer Science courses?

Yes .... ☐ ⟶ If Yes, go to G1 below.

No................. ☐ ⟶ If No, go to Section H.

- *Please refer to the course reporting instructions at the beginning of Section E.*
- In December 2001, a joint IEEE Computer Society/ACM Task Force issued its recommendations on "Computing Curricula 2001: Computer Science" That report replaced the curricula recommendations published by ACM in 1991 and is available by clicking here. Course titles in G-1 through G-17 are taken from that report.

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Tenured or Tenure-eligible Faculty (d)	Other Full-time Faculty with/without Ph.D. (e)	Part-time Faculty (f)	Graduate Teaching Assis-tants[3] (g)
COMPUTER SCIENCE							
GENERAL EDUCATION COURSES							
G1. Computers and Society, Issues in CS							
G2. Intro. to Software Packages							
G3. Other CS General Education Courses							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollments (see Section B).
[3] Sections taught independently by GTAs.

G. Computer Science Courses (Fall 2010) (continued)

Mathematics Questionnaire

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Tenured or Tenure-eligible Faculty (d)	Other Full-time Faculty with/without Ph.D. (e)	Part-time Faculty (f)	Graduate Teaching Assistants[3] (g)
COMPUTER SCIENCE							
INTRODUCTORY CS COURSES							
G4. Computer Programming I (CS101 or 111)[4]							
G5. Computer Programming II (CS102 or 112 and 113)[4]							
G6. Discrete Structures for CS (CS105, 106, or 11 5)[4], but not courses E20 or E28 in Section E above							
G7. All other introductory level CS courses							
INTERMEDIATE LEVEL							
G8. Algorithm Design and Analysis (CS210)[4]							
G9. Computer Architecture (CS220, 221, or 222)[4]							
G10. Operating Systems (CS225, 226)[4]							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollments (see Section B).
[3] Sections taught independently by GTAs.
[4] Course numbers from CC2001.

G. Computer Science Courses (Fall 2010) (continued)

◆ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corresponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Tenured or Tenure-eligible Faculty (d)	Other Full-time Faculty with/ without Ph.D. (e)	Part-time Faculty (f)	Graduate Teaching Assistants[3] (g)
COMPUTER SCIENCE							
INTERMEDIATE LEVEL CONT.							
G11. Net-centric Computing (CS230)[4]							
G12. Programming Language Translation (CS240)[4]							
G13. Human-Computer Interaction (CS250)[4]							
G14. Artificial Intelligence (CS260, 261, 262)[4]							
G15. Databases (CS270, 271)[4]							
G16. Social and Professional Issues in Computing (CS280)[4]							
G17. Software Development (CS290, 291, 292)[4]							
G18. All other intermediate level CS courses							
UPPER LEVEL							
G19. All upper level CS Courses (numbered 300 or above in CC2001)							

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual enrollments (see Section B).
[3] Sections taught independently by GTAs.
[4] Course numbers from CC2001.

H. Instruction in College Algebra, Calculus and Introductory Statistics

Mathematics Questionnaire

College Algebra Instruction

H1. If course E6 (College Algebra) has non-zero enrollment, give the number of sections that:

a. Emphasize problem solving in the modeling sense (data => model => interpretation) ☐

b. Include elementary data analysis ☐

c. Include writing assignments ☐

d. Include small group activities ☐

e. Include small group projects ☐

f. Include class presentations ☐

g. Use graphing calculators ☐

h. Use spreadsheets ☐

i. Use online homework generating and grading packages ☐

j. Use classroom response systems (e.g., clickers) ☐

k. Primarily use a traditional approach (sections that are basically the same College Algebra course that was taught in 1990) ☐

Calculus Instruction

H2. Do you offer some type of Honors Calculus course that differs from your usual calculus course(s)?

Yes ☐ → If Yes, continue with H3.

No ☐ → If No, go to H5.

H3. For each level below, indicate if you offer an Honors course.

	Offer honors	Do not offer honors
a. Calculus I	☐	☐
b. Calculus II	☐	☐
c. Calculus III	☐	☐

H4. If you offer Honors Calculus, check all differences between Honors Calculus and regular Calculus:

The Honors Calculus Class:	Yes	No
a. Contains more theory	☐	☐
b. Contains more applications	☐	☐
c. Is aimed at mathematics majors	☐	☐
d. Requires a score on some kind of test or other placement mechanism as a pre-requisite for enrollment	☐	☐
e. Can be selected by any interested student — without a required test score or other placement mechanism	☐	☐

H. Instruction in College Algebra, Calculus and Introductory Statistics (continued)

Introductory Statistics Instruction (taught within the mathematics department):

H5a. Does your department offer an elementary statistics course for non-majors that has no calculus prerequisite?

Yes .... ☐ → If Yes, continue with H5b.

No .... ☐ → If No, go to section I.

H5b. In most sections of this course, the percentage of class sessions in which real data are used is generally approximately:

0-20% .... ☐

21-40% .... ☐

41-60% .... ☐

61-80% .... ☐

81-100% .... ☐

H6. In most sections of this course, the percentage of class sessions in which in-class demonstrations and/or in-class problem solving activities/discussions generally take place is approximately:

0-20% .... ☐

21-40% .... ☐

41-60% .... ☐

61-80% .... ☐

81-100% .... ☐

H7. Which, if any, of the following kinds of technology are used in a majority of the sections of this course? *(Check one on each line.)*

	Yes	No
a. Graphing calculators	☐	☐
b. Statistical packages (e.g. SAS, SPSS, Minitab)	☐	☐
c. Educational software..	☐	☐
d. Applets..	☐	☐
e. Spreadsheets...	☐	☐
f. Web-based resources including data sources, online texts, and data analysis routines	☐	☐
g. Classroom response systems (e.g., clickers)	☐	☐

H8. Do most sections of this course require assessments beyond homework, exams, and quizzes (assessments such as projects, oral presentations, written reports)?

Yes .... ☐

No .... ☐

I. Undergraduate Program (Fall 2010)

Mathematics Questionnaire

If you do not offer a major in a mathematical science, check here ☐ and go to I10. Otherwise go to I1.

I1. Report the total number of your departmental majors who received their bachelor's degrees in the mathematical sciences or computer sciences from your institution between July 1, 2009 and June 30, 2010. Include joint majors and double majors[1] .... ☐

I2. Of the undergraduate degrees described in I1, please report the number who majored in each of the following categories. Each student should be reported only once. Include all double and joint majors[1] in your totals. Use the Other category for a major in your department who does not fit into one of the earlier categories.

Area of Major	Male	Female
a. Mathematics (including applied)..........		
b. Mathematics Education.....................		
c. Statistics...................................		
d. Computer Science		
e. Actuarial Mathematics		
f. Joint[1] Mathematics Majors..................		
g. Other mathematics majors		

[1] A "double major" is a student who completes the degree requirements of two separate majors, one in mathematics and one in another program or department. A "joint major" is a student who completes a single major in your department that integrates courses from mathematics and some other program or department and typically requires fewer credit hours that the sum of the credit hours required by the separate majors.

I3. How many different courses at your institution offered during spring 2010 or fall 2010 are team taught by a member(s) of your department and a member(s) of another department? ☐

I. Undergraduate Program (Fall 2010) (continued)

I4. Has your department taught new interdisciplinary course(s) in the last five years? (An interdisciplinary course is one in which mathematics is taught with relation to another field, such as mathematics and economics or mathematics and education.)

Yes .... ☐ → If Yes, continue with I5.

No .... ☐ → If No, go to I6.

I5. If yes, give the number of new courses offered in each of the interdisciplinary areas below:

a. Mathematics and finance or business .... ☐

b. Mathematics and biology .... ☐

c. Mathematics and the study of the environment .... ☐

d. Mathematics and engineering or the physical sciences .... ☐

e. Mathematics and economics .... ☐

f. Mathematics and social sciences other than economics ...... ☐

g. Mathematics and education .... ☐

h. Mathematics and the humanities .... ☐

i. Other .... ☐

I6. How many different tracks (sets of graduation requirements) are there in your institution's undergraduate mathematics major?.............................. ☐

I. Undergraduate Program (Fall 2010) (continued)

Mathematics Questionnaire

I7. To what extent must majors in your department complete the following? Check one box in each row.

	Required of all majors	Required of some but not all majors	Not required of any major
a. Modern Algebra I	☐	☐	☐
b. Real Analysis I	☐	☐	☐
c. Modern Algebra I or Real Analysis I (majors may choose either to fulfill this requirement)	☐	☐	☐
d. A one-year upper level sequence	☐	☐	☐
e. At least one computer science course	☐	☐	☐
f. At least one statistics course	☐	☐	☐
g. At least one applied mathematics course beyond course E21 (in Section E)	☐	☐	☐
h. A capstone experience (e.g., a senior project, a senior thesis, a senior seminar, or an internship)	☐	☐	☐
i. An exit exam (written or oral)	☐	☐	☐

I8. Many departments today use a spectrum of program-assessment methods. Please indicate whether each of the following apply to your department's undergraduate program-assessment efforts during the <u>last six years.</u>

	Yes	No
a. We conducted a review of our undergraduate program that included one or more reviewers from outside of our institution	☐	☐
b. We asked graduates of our undergraduate program to comment on and suggest changes in our undergraduate program	☐	☐
c. Other departments at our institution were invited to comment on the preparation that their students received in our courses	☐	☐
d. Data on our students' progress in subsequent mathematics courses were gathered and analyzed	☐	☐
e. We have a placement system for first-year students and we gathered and analyzed data on its effectiveness	☐	☐
f. Our department's program assessment activities led to changes in our undergraduate program	☐	☐

I. Undergraduate Program (Fall 2010) (continued)

I9. If you offer a major in some mathematical science, please give your best estimate of the percentage of your department's graduating majors from the previous academic year (reported in I1) in each of the following categories. Please make the totals add to 100 percent.

a. Who went into pre-college teaching	%
b. Who went to graduate school in the mathematical sciences	%
c. Who went to professional school or to graduate school outside of the mathematical sciences	%
d. Who took jobs in business, industry, government, etc.	%
e. Who had other post-graduation plans known to the department	%
f. Whose plans are not known to the department	%

I10. For each of the following opportunities, indicate whether or not it is available to your undergraduate mathematics students

	Yes	No
a. Honors sections of departmental courses	☐	☐
b. An undergraduate Mathematics Club	☐	☐
c. Special mathematics programs to encourage women	☐	☐
d. Special mathematics programs to encourage minorities	☐	☐
e. Opportunities to participate in mathematics contests	☐	☐
f. Special mathematics lectures/colloquia not part of a mathematics club	☐	☐
g. Mathematics outreach opportunities in local K-12 schools	☐	☐
h. Undergraduate research opportunities in mathematics	☐	☐
i. Independent study opportunities in mathematics	☐	☐
j. Assigned faculty advisers in mathematics	☐	☐
k. Opportunity to write a senior thesis in mathematics	☐	☐
l. A career day for mathematics majors	☐	☐
m. Special advising about graduate school opportunities in mathematical sciences	☐	☐
n. Opportunity for an internship experience	☐	☐
o. Opportunity to participate in a senior seminar	☐	☐

I. Undergraduate Program (Fall 2010) (continued)

Mathematics Questionnaire

I11. Responses to this question will be used to project total enrollment in the current (2010-2011) academic year based on the pattern of your departmental enrollments in 2009-2010. Do NOT include any numbers from dual enrollment courses[1] in answering question I11.

a. Previous fall (2009) total student enrollment in your department's undergraduate mathematics, statistics, and computer science courses (remember: do not include dual enrollment courses[1]): ....

b. Previous academic year (2009-2010) total enrollment in your department's undergraduate mathematics, statistics, and computer science courses, excluding dual enrollments[1] and excluding enrollments in summer school 2010:..

c. Total enrollment in your department's undergraduate mathematics, statistics, and computer science courses in summer school 2010: ....

d. Total enrollment in Calculus II in winter/spring term of 2010 (combine the winter and spring terms if using the quarter system):........................

e. Total number of sections in Calculus II in winter/spring term of 2010:.....

---

[1] In this question, the term "dual enrollment courses" is used to mean courses taught on a high school campus, by high school teachers, for which high school students may obtain high school credit and, simultaneously, college credit through your institution.

I12.

a. How many freshmen enrolled in your institution in fall 2010? ....

b. How many of these freshmen entered this fall with AP credit for Calculus I? ....

J. Pre-service Teacher Education in Mathematics

Mathematics Questionnaire

Questions regarding pre-service teacher preparation:

J1. Does your institution have a program of certification for pre-service secondary teachers (i.e. a program that leads to obtaining credentials to teach secondary mathematics in public high schools of your state)?

Yes .... ☐ → If Yes, go to J2.

No .... ☐ → If No, skip to J5.

J2. If your institution has a program of certification for pre-service secondary teachers, does your institution have a school or department of education that is separate from your department?

Yes .... ☐ → If Yes, go to J3.

No .... ☐ → If No, skip to J4.

J3. If you answered Yes to J2, does your department offer any courses for pre-service secondary teachers that are team-taught by faculty in the Mathematics Department and the Education Department/School of your institution?

Yes .... ☐

No .... ☐

J4. Considering the teacher preparation program at your institution, in each of the following core areas indicate whether the core area is required of all students seeking mathematics certification, if the course is generally taken by those seeking certification (if it is not required), and if in that core area your department offers a special course that is specifically designed for pre-service secondary mathematics teachers.

	Required		Generally Taken		Special Course Offered	
Course	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
a. Advanced Calculus/Analysis	☐	☐	☐	☐	☐	☐
b. Modern Algebra....................	☐	☐	☐	☐	☐	☐
c. Number Theory....................	☐	☐	☐	☐	☐	☐
d. Geometry	☐	☐	☐	☐	☐	☐
e. Discrete Mathematics...........	☐	☐	☐	☐	☐	☐
f. Statistics...............................	☐	☐	☐	☐	☐	☐
g. History of Mathematics.........	☐	☐	☐	☐	☐	☐
h. Other (name).......................	☐	☐	☐	☐	☐	☐

J. Pre-service Teacher Education in Mathematics (continued)

Mathematics Questionnaire

Questions regarding the mathematical preparation for K-8 pre-service teachers:

J5. Does your institution have a program of certification for pre-service K-8 teachers (i.e. a program that leads to obtaining credentials to teach mathematics in grades K-8 in public schools in your state)?

Yes................ ☐ ⟶ If Yes, go to J6.

No .... ☐ ⟶ If No, skip to section K (the last page).

J6. If your institution has a program of certification for pre-service K-8 teachers, does your institution have a school or department of education that is separate from your department?

Yes................ ☐ ⟶ If Yes, go to J7.

No .... ☐ ⟶ If No, skip to J8.

J7. If you answered Yes to I6, does your department offer any courses for pre-service elementary teachers that are team-taught by faculty in the Mathematics Department and the Education Department/School of your institution?

Yes................ ☐

No .... ☐

Certification requirements for pre-service "early" elementary teachers

Many institutions have different certification requirements for pre-service elementary teachers preparing for early grades and those preparing for later grades. However, there is no national agreement on which grades are "early" grades and which are "later" grades, except that grades 1 and 2 are "early" and grades 6 and above are generally "later" grades. If your institution makes no early/later distinction, regard all elementary pre-service teachers as "early" grade teachers in responding to the questions below:

J8. How many mathematics courses (courses taught in the Mathematics Department) are required for certification as a pre-service "early" elementary teacher at your institution?

Number of mathematics courses required........................ ☐

J9. How many specialized courses on methods of teaching mathematics (i.e., mathematics pedagogy) are required for certification as a pre-service "early" elementary teacher? How many of these courses are taught in the Mathematics Department?

a. Number of methods courses required .... ☐

b. Number taught in the Mathematics Department .... ☐

J. Pre-service Teacher Education in Mathematics (continued)

Questions regarding the mathematical preparation of all early pre-service mathematics teachers:

J10. In which (if any) of the following core areas below does your department offer courses specifically designed for pre-service mathematics elementary teachers (courses specifically designed to provide pre-service mathematics teachers preparation for teaching mathematics in elementary schools):

	Yes	No
a. Numbers/Operations	☐	☐
b. Algebra	☐	☐
c. Geometry/Measurement	☐	☐
d. Statistics/Probability	☐	☐
e. Methods of teaching elementary grades mathematics	☐	☐
f. Other (specify: ________________________)	☐	☐

J11. If your department offers courses in the any of the areas in J10 above, who generally teaches these courses? (Choose the one answer that best applies.)

Tenured/tenure-track faculty............ ☐
Postdocs .... ☐
Other full-time faculty .... ☐
Part-time faculty .... ☐
Graduate teaching assistants .... ☐

J12. Does your institution offer a program to prepare “mathematics specialists” to teach in any elementary K-8 grades? (A “mathematics specialist” is an elementary teacher who is likely to teach only mathematics courses.)

Yes................ ☐ ⟶ If Yes, go to J13.

No .... ☐ ⟶ If No, skip to section K (the last page).

J13. If you answered Yes to J12, does your institution offer a program to prepare “mathematics specialists” to teach in the early elementary grades?

Yes................ ☐

No .... ☐

K. Comments and Suggestions

Mathematics Questionnaire

If you found some question(s) difficult to interpret or answer, please let us know. We welcome suggestions to improve future surveys (e.g., CBMS 2015).

Comments: ____

____

____

____

____

____

Thank you for completing this questionnaire. We know it was a time-consuming process and we hope that the resulting survey report, which we hope to publish in spring 2012, will be of use to you and your department.

Please keep a copy of your responses to this questionnaire in case questions arise.

Appendix V

Two-Year Mathematics Questionnaire

TWO-YEAR QUESTIONNAIRE

CBMS2010

CONFERENCE BOARD OF THE MATHEMATICAL SCIENCES

SURVEY OF UNDERGRADUATE PROGRAMS IN THE MATHEMATICAL SCIENCES

General Instructions

As part of a random sample, your department has been selected to participate in the CBMS2010 National Survey, the importance of which has been endorsed by all of our major professional societies. Please read the instructions in each section carefully and complete all of the pertinent items as indicated.

If your college does not have a departmental or divisional structure, consider the group of all mathematics instructors to be the “mathematics department” for the purpose of this survey.

Because your campus is part of a multi-campus two-year system, special instructions apply. Our understanding is that your campus is administered separately from some of the other campuses in the system. Please do not include data on any campuses that are geographically or budgetarily separate from yours. If you disagree with this characterization of your multi-campus, please call Westat at 888-248-5017..

This questionnaire should be completed by the person who is directly in charge of the mathematics program or department on your campus.

Report on all of your courses and instructors that fall under the general heading of the mathematics program or department. Include all mathematics and statistics courses taught within your mathematics program or department. You will also be asked separately about enrollments in mathematics courses outside of the mathematics department: for example, mathematics courses administered in a developmental education division.

We have classified your department as belonging to a two-year college, to a college or campus within a two-year system, or to a two-year branch of a university system. If this is not correct, please contact Richelle (Rikki) Blair at the email address or telephone number given below.

We recommend completing this questionnaire online because the online system will automatically skip those questions that are not applicable to you (based on the responses you give). However, this survey may be completed using a hard-copy questionnaire.

If you have any questions, please contact Richelle (Rikki) Blair, Associate Director for Two-Year Colleges, by email at richelle.blair@sbcglobal.net or by phone at 440-212-5965. For help with the online questionnaire, call Westat at 888-248-5017.

Please return your completed questionnaire by November 26, 2010, either online or by mailing a hard copy to:

CBMS Survey
Westat
1600 Research Boulevard
Rockville, MD 20850-3129

Please retain a copy of your responses to this questionnaire in case questions arise.

A. General Information

PLEASE PRINT CLEARLY

A1. Name of your campus: ____________________

A2. Name of your department: ____________________

A3. Mailing address of the multi-campus organization to which your campus belongs (if any). (Write NA if your campus does not belong to a multi-campus organization.)

____

____

A4. We have classified your department as belonging to a two-year college or to a college campus within a two-year college system, or to a two-year branch of a university system. Do you agree?

Yes .... ☐ ⟶ go to the next question.

No .... ☐ ⟶ please contact Richelle (Rikki) Blair, Survey Associate Director, by email (richelle.blair@sbcglobal.net) or by phone (440-212-5965) before proceeding any further.

A5. What is the unit (= academic discipline group) that most directly administers the mathematics program on your campus? *(Check one box.)*

The unit that administers mathematics on my campus is located in the:

- Mathematics Department (department does not offer Computer Science) .... ☐
- Mathematics and Computer Science Department or Division (department also offers Computer Science, whether or not it is part of the title) .... ☐
- Mathematics and Science Department or Division .... ☐
- Other Departments or Division .... ☐

A. General Information (cont.)

A6. To help us project enrollment for the current academic year (2010–2011), please give the following enrollment figures for the previous academic year (2009–2010) not counting summer enrollment.

a. Fall 2009 total student enrollment in your mathematics program .... ☐

b. Entire academic year 2009–2010 enrollment in your mathematics program...... ☐

c. Calculus II total enrollment in winter/spring 2009.. ☐

d. Calculus II total number of sections in winter/spring 2009 .... ☐

A7. Does your college organize its **developmental education**, including mathematics, in a separately administered department or division?

Yes................ ☐

No .... ☐

A8. Your name or contact person in your department: ☐

A9. Your email address or contact person's email address: ☐

A10. Your phone number or contact person's phone number including area code: ☐

A11. Campus mailing address: ☐

B. Mathematics Faculty in the Mathematics Department/Program (Fall 2010)

- Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.
- Underlined faculty categories defined in this section will be used in later sections.

B1. For all 2010, what is the **total number of full-time mathematics faculty in your department/program**, both permanent and temporary, including those on leave or sabbatical?

Number of full-time mathematics faculty .... ☐

B2. Of the number in B1, how many are tenured, tenure-eligible, or on your permanent faculty (including faculty who are on leave or sabbatical)? We will refer to these as "**permanent full-time faculty.**"

Number of permanent full-time faculty .... ☐

B3. Give the number of **"other full-time faculty"** by computing B1 minus B2........... ☐

B4. For the **permanent full-time faculty** reported in B2,

a. give the required teaching assignment in weekly contact hours....................... ☐

b. give the maximum percentage of the weekly teaching assignment in B4a that can be met by teaching distance learning classes (= classes where at least half the students receive the majority of instruction by technological or other methods where the instructor is not physically present) (write NA if your institution does not have distance learning or does not have such a policy) .... ☐

c. give the number of office hours required weekly in association with the teaching assignment in B4a (count all office hours, including those offered online)... ☐

B5. Of the **permanent full-time faculty** reported in B2, how many teach extra hours for extra pay at your campus or within your organization? *(Enter one response on each line.)*

Number who teach extra hours for extra pay at your campus or within your organization .... ☐

☐

B. Mathematics Faculty in the Mathematics Department/Program (Fall 2010) (cont.)

B6. Of the **permanent full-time faculty** reported in B5a, how many extra hours per week do they teach on average for each person?

a. Number who teach 1–3 hours extra weekly .... ☐

b. Number who teach 4–6 hours extra weekly .... ☐

c. Number who teach 7 or more hours extra weekly .... ☐

B7. For fall 2010, how many **part-time mathematics faculty** are employed? (Note: none of these were reported above.)

a. Number of part-time mathematics faculty **paid by your college**..................... ☐

b. Number of part-time faculty **paid only by a third party**, such as a school district paying faculty who teach dual-enrollment courses (= courses taught in high school by high school teachers for which students may obtain high school credit and simultaneous college credit through your institution)........... ☐

c. **Total number of part-time faculty** (add B7a and B7b) .... ☐

B8. How many **part-time faculty paid by your college** (reported in B7a) teach 6 or more hours per week?

Number in B7a teaching 6 or more hours/week .... ☐

B9. Are office hours required by college policy for the **part-time faculty paid by your college** (reported in B7a)?

Yes................ ☐

No .... ☐

C. Courses Taught via Distance

Definition: Distance learning courses are courses in which the majority of instruction occurs with the instructor and the students separated by time and/or place (e.g., courses in which the majority of the course is taught online or by computer software or correspondence).

C1. Are the content, goals, and objectives of the distance learning mathematics courses generally the same as the face-to-face courses of the same title?

- Yes ☐ → go to C2.
- No ☐ → go to C2.
- Do not have distance learning mathematics courses ☐ → go to D1.

C2. How are the instructional materials used in distance learning courses generally determined? *(Check one box.)*

- Faculty created materials ☐
- Faculty choose commercially produced materials ☐
- A combination of both ☐

C3. Which best characterizes the format/structure of the majority of your distance learning courses? *(Check one box.)*

- Completely online: Instruction takes place entirely online ☐
- Hybrid: Instruction takes place in a combination of face-to-face and online formats ☐
- Other (specify) ____________ ☐

C4. If a faculty member teaches his/her entire teaching load using distance education, how often is the faculty member required to be on campus to meet with students? *(Check one box.)*

- Never ☐
- Only for a particular scheduled meeting or student appointment ☐
- A specified number of office hours per week ☐
- Not applicable ☐

C5. In most distance learning courses, how and where do students take the majority of their tests? *(Check one box.)*

- Completely online and unproctored ☐
- At a proctored testing site ☐
- Combination of both ☐

C. Courses Taught via Distance (cont.)

C6. For those distance learning courses that are offered by multiple instructors, is there a common departmental examination that is used for all of the courses? *(Check one box.)*

We have no common departmental examinations ☐

We have common departmental examinations for some courses ☐

We have common departmental examinations for all courses offered by multiple instructors ☐

Not applicable; there are no courses offered by multiple instructors ☐

C7. Are there any courses that you offer in both non-distance learning and in distance learning formats?

Yes ☐ → If Yes, go to C8 below.

No ☐ → If No, go to C9.

C8. Which, if any of the following practices, applies to the majority of distance learning courses in your department? (Please check one box on each line.)

	Yes	No
a. Same examinations as in the face-to-face course	☐	☐
b. Same common course outlines as in the face-to-face course	☐	☐
c. Same course projects	☐	☐

C9. Do the instructors in your distance learning courses generally participate in evaluation of instruction using the same criteria and types of evaluation tools as faculty who teach comparable non-distance learning courses?

Yes ☐

No ☐

D. Developmental Mathematics

D1. Which of the following options are available to students in developmental mathematics courses at your institution? *(Check yes or no for each section.)*

Generic name for course	Accelerated Sections		Slower-Paced Sections		Learning Communities		Summer Boot Camp		Not applicable (course not offered)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
a. Arithmetic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b. Pre-Algebra	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c. Beginning Algebra	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
d. Intermediate Algebra	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

D2. What is your departmental policy on the most sophisticated technology that students are required or allowed to usein each of the following courses? If different rules apply at different times during a course, please report on the most common practice for that course. *(Check one box in each row.)*

Course	No Calcu-lator Allowed	Most sophisticated technology that is required or allowed f:				No Depart-ment Policy	Not applicable (course not offered)
		Four-Function Calculator	Scientific Calculator	Graphing Calculator	Computer-Based Tools		
a. Arithmetic	☐	☐	☐	☐	☐	☐	☐
b. Pre-Algebra ..	☐	☐	☐	☐	☐	☐	☐
c. Beginning Algebra	☐	☐	☐	☐	☐	☐	☐
d. Intermedi-ate Algebra ...	☐	☐	☐	☐	☐	☐	☐

E. College Algebra–What Is It?

E1. Does your college offer a course titled "College Algebra"?

Yes .... ☐

No .... ☐

E2. Please indicate which of the statements below describe the purpose and design of your department's course titled "College Algebra." *(Check one on each line.)*

Purpose/design of College Algebra is to:	**Yes**	**No**	**Not applicable**
a. Prepare students for Trigonometry and/or Engineering or other Calculus........	☐	☐	☐
b. Prepare students for Business Calculus, but not engineering Calculus	☐	☐	☐
c. Strengthen the general quantitative literacy, mathematical reasoning, modeling skills, and problem-solving ability for students who do not intend to take calculus........	☐	☐	☐
d. Provide an option for students who intend to take no additional mathematics course(s)........	☐	☐	☐

E3. Which of the following best describes the course structure and method of teaching the course titled "College Algebra?" *(Choose one.)*

Traditional content of algebra manipulations to prepare for Calculus, taught primarily by lecture .... ☐

Content is emphasized through modeling and problem solving with the goals of strengthening quantitative literacy and reasoning .... ☐

E4. Which items below describe students' use of technology in the course titled "College Algebra?" *(Check one on each line.)*

a. Type of Calculator:	**Departmental policy states that calculator is:** Required	Allowed	Forbidden	Instructors Allowed to Decide	**No Department Policy**
1. Scientific	☐	☐	☐	☐	☐
2. Graphing	☐	☐	☐	☐	☐
3. Calculators with Algebra System	☐	☐	☐	☐	☐

	Yes	**No**
b. Instructors and/or students use spreadsheets	☐	☐
c. Students use commercial programs that provide them with assistance and/or homework solutions........................	☐	☐
d. Students use computer algebra systems	☐	☐
e. Students are required to submit homework via an online platform.....	☐	☐
f. Web-based resources including data sources, on-line texts, and data analysis routines........................	☐	☐

F. Dual Enrollment Courses

- Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.
- In this questionnaire, we use the term "dual-enrollment courses" to mean courses taught in **high school by high school teachers** for which students may obtain high school credit and simultaneous college credit through your institution.

F1. Does your department participate in any dual-enrollment program of the type defined above?

Yes................ ☐ ⟶ go to F2.

No .... ☐ ⟶ go to F5.

F2. Please provide the head-count enrollment for your dual-enrollment program (as defined above) for the spring term of 2010 and for the current fall term of 2010.

Course	Total Dual Enrollments Last Term = Spring 2010	Total Dual Enrollments This Term = Fall 2010
a. College Algebra		
b. Precalculus		
c. Calculus I		
d. Statistics		
e. Other		

F3. For the dual-enrollment courses in F2, which of the following are the responsibility of your department?

	Never Our Responsibility	Sometimes Our Responsibility	Always Our Responsibility
a. Choice of textbook	☐	☐	☐
b. Design/approval of syllabus	☐	☐	☐
c. Design of final exam	☐	☐	☐
d. Choice of instructor	☐	☐	☐

F. Dual Enrollment Courses cont.

F4. Are instructors in the dual-enrollment courses reported in F2 required to participate in the teaching evaluation program for part-time departmental faculty?

Yes................ ☐

No .... ☐

F5. Does your department assign any of its own full-time or part-time faculty (faculty paid by your college as reported in either B1 or B7a) to teach courses on a high school campus for which high school students may receive both high school and college credit through your institution?

Yes................ ☐ → go to F6.

No .... ☐ → go to Section G.

F6. Please provide the high school student enrollments (head counts) as taught by your faculty on a high school campus. See F5.

Course	Total Dual Enrollments Last Term = Spring 2010	Total Dual Enrollments This Term = Fall 2010
a. College Algebra		
b. Precalculus		
c. Calculus I		
d. Statistics		
e. Other		

G. Mathematics Courses (Fall 2010)

The following instructions apply throughout **Section G.** Read them carefully before you begin filling out the tables.

- Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.
- When completing this section, do **not** include courses taught in other departments, learning centers, or developmental/remedial programs separate from your mathematics program or department. Those enrollments will be listed in Section P.
- Read the row and column labels carefully. If the titles of courses listed below do not coincide exactly with yours, use your best judgment about where to list your courses. List each course only **once.** Note that the **part-time faculty** in Column f are those reported in B7(a) (part-time faculty paid by your college). Column f should **not** include any of your full-time faculty who teach an overload section.
- If a course is **not** taught at your campus during the fall term or if it is never taught at your campus, leave the cell blank.
- Do **not** include dual-enrollment sections taught in high school by high school teachers for which students receive simultaneous high school and college credit through your institution.

◆ **Cells left blank will be interpreted as zeros**

Name of Course (or equivalent)	Total number of students enrolled fall 2010 via distance learning[a] (a)	Total number of sections taught fall 2010 via distance learning[a] (b)	Total number of on-campus students enrolled fall 2010[b] (c)	Total number of on-campus sections fall 2010[b] (d)	**LIST THE NUMBER OF SECTIONS FROM COLUMN (d) THAT:** have enrollment above 30 (e)	are taught by part-time faculty[c] (f)	use computer algebra systems[d] (g)	use commercially produced electronic instructional packages[d] (h)	are taught mostly by the standard lecture method (i)
G1. Arithmetic/Basic Mathematics									
G2. Pre-Algebra									
G3. Elementary Algebra (high school level)									
G4. Intermediate Algebra (high school level)									
G5. Geometry (high school level)									

[a] At least half of the students in the section receive more than 50% of their instruction via Internet, TV, computer, programmed instruction, correspondence courses, or other method where the instructor is **not** physically present.
[b] These students are **not** included in column a.
[c] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty reported in B7a, i.e., those paid by your college.
[d] Only count sections where these tools are an integral part of the course.

G. Mathematics Courses (Fall 2010) (cont.)

◆ **Cells left blank will be interpreted as zeros**

Name of Course (or equivalent)	Total number of students enrolled fall 2010 via distance learning[a] (a)	Total number of sections taught fall 2010 via distance learning[a] (b)	Total number of on-campus students enrolled fall 2010[b] (c)	Total number of on-campus sections fall 2010[b] (d)	LIST THE NUMBER OF SECTIONS FROM COLUMN (d) THAT: have enrollment above 30 (e)	are taught by part-time faculty[c] (f)	use computer algebra systems (g)	use commer-cially produced electronic instructional packages (h)	are taught mostly by the standard lecture method (i)
G6. College Algebra (level beyond intermediate Algebra)									
G7. Trigonometry									
G8. College Algebra and Trigonometry, combined									
G9. Introduction to Mathematical Modeling									
G10. Precalculus/Elementary Functions/Analytic Geometry									

[a] At least half of the students in the section receive more than 50% of their instruction via Internet, TV, computer, programmed instruction, correspondence courses, or other method where the instructor is **not** physically present.

[b] These students are **not** included in column a.

[c] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B7a, i.e., those paid by your college.

G. Mathematics Courses (Fall 2010) (cont.)

◆ **Cells left blank will be interpreted as zeros**

Name of Course (or equivalent)	Total number of students enrolled fall 2010 via distance learning[a] (a)	Total number of sections taught fall 2010 via distance learning[a] (b)	Total number of on-campus students enrolled fall 2010[b] (c)	Total number of on-campus sections fall 2010[b] (d)	LIST THE NUMBER OF SECTIONS FROM COLUMN (d) THAT: have enrollment above 30 (e)	are taught by part-time faculty[c] (f)	use computer algebra systems (g)	use commer-cially produced electronic instructional packages (h)	are taught mostly by the standard lecture method (i)
G11. Mainstream Calculus I[d]									
G12. Mainstream Calculus II[d]									
G13. Mainstream Calculus III[d]									
G14. Non-Mainstream Calculus I[e]									
G15. Non-Mainstream Calculus II[e]									
G16. Differential Equations									
G17. Linear Algebra									
G18. Discrete Mathematics									

[a] At least half of the students in the section receive more than 50% of their instruction via Internet, TV, computer, programmed instruction, correspondence courses, or other method where the instructor is **not** physically present.

[b] These students are **not** included in column a.

[c] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B7a, i.e., those paid by your college.

[d] Typically for mathematics, physical sciences, and engineering majors.

[e] Typically for business, life sciences, and social science majors.

G. Mathematics Courses (Fall 2010) (cont.)

◆ **Cells left blank will be interpreted as zeros**

Name of Course (or equivalent)	Total number of students enrolled fall 2010 via distance learning[a] (a)	Total number of sections taught fall 2010 via distance learning[a] (b)	Total number of on-campus students enrolled fall 2010[b] (c)	Total number of on-campus sections fall 2010[b] (d)	**LIST THE NUMBER OF SECTIONS FROM COLUMN (d) THAT:** have enrollment above 30 (e)	are taught by part-time faculty[c] (f)	use computer algebra systems (g)	use commer-cially produced electronic instructional packages (h)	are taught mostly by the standard lecture method (i)
G19. Elementary Statistics (with or without probability)[d]									
G20. Probability (with or without statistics)[d]									
G21. Finite Mathematics									
G22. Mathematics for Liberal Arts/ Math Appreciation/ Quantitative Literacy									
G23. Mathematics for Elementary School Teachers I									
G24. Mathematics for Elementary School Teachers II									
G25. Other Mathematics Courses for Teacher Preparation									

[a] At least half of the students in the section receive more than 50% of their instruction via Internet, TV, computer, programmed instruction, correspondence courses, or other method where the instructor is **not** physically present.
[b] These students are **not** included in column a.
[c] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B7a, i.e., those paid by your college.
[d] Do **not** count the same course in both lines C19 and C20.

G. Mathematics Courses (Fall 2010) (cont.)

◆ **Cells left blank will be interpreted as zeros**

Name of Course (or equivalent)	Total number of students enrolled fall 2010 via distance learning[a] (a)	Total number of sections taught fall 2010 via distance learning[a] (b)	Total number of on-campus students enrolled fall 2010[b] (c)	Total number of on-campus sections fall 2010[b] (d)	LIST THE NUMBER OF SECTIONS FROM COLUMN (d) THAT: have enrollment above 30 (e)	are taught by part-time faculty[c] (f)	use computer algebra systems (g)	use commer-cially produced electronic instructional packages (h)	are taught mostly by the standard lecture method (i)
G26. Business Mathematics[d]									
G27. Business Mathematics (transfer course)									
G28. Non-Calculus-Based Technical Mathematics[d]									
G29. Calculus-Based Technical Mathematics (transfer course)									
G30. Other Mathematics Courses (non-transfer)									
G31. Other Mathematics Courses (transfer)									

[a] At least half of the students in the section receive more than 50% of their instruction via Internet, TV, computer, programmed instruction, correspondence courses, or other method where the instructor is **not** physically present.

[b] These students are **not** included in column a.

[c] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B7a, i.e., those paid by your college.

[d] Mathematics courses for AAS programs, not a transfer course to four-year college.

H. Faculty Educational Level, by Subject Field

H1. For the **permanent full-time faculty** (including those on leave or sabbatical) reported in B2, complete the following table showing the area of each faculty member's highest earned degree. The total of all faculty listed in this table should equal _____, the number reported in B2.

- If you are part of a multi-campus system, please report for the entire system.

	Number of Full-Time Faculty by Major Field of Highest Degree			
Highest Degree	Mathematics	Statistics	Mathematics Education	Other
a. Doctorate				
b. Master's				
c. Bachelor's				

H. Faculty Educational Level, by Subject Field (cont.)

H2. For the **part-time faculty** reported in B7c (including those paid by your college and those paid by a third party), complete the following table showing the area of each faculty member's highest earned degree. The total of all faculty listed in this table should equal ____, the number reported in B7c.

- If you are part of a multi-campus system, please report for the entire system.

	Number of Part-Time Faculty by Major Field of Highest Degree			
Highest Degree	Mathematics	Statistics	Mathematics Education	Other
a. Doctorate				
b. Master's				
c. Bachelor's				

I. Faculty by Gender and Ethnicity/Race

Instructions:

- Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.
- For the **permanent full-time faculty** (including those on leave) reported in B2 and for the **part-time faculty** reported in B7a (those paid by your college), complete the following table giving data about gender and ethnicity/race.
- The total of full-time faculty should equal the figure given in B2. The total of part-time faculty should equal ____, the figure reported in B7a.

Ethnic/Racial Status and Gender		Number of Faculty		
		Permanent Full-Time Faculty From B2		Part-Time Faculty From B7a
		Age < 40	Age ≥ 40	
1. American Indian, Alaskan Native	Male			
	Female			
2. Asian	Male			
	Female			
3. Black or African American (non-Hispanic)	Male			
	Female			
4. Mexican-American, Puerto Rican, or other Hispanic	Male			
	Female			
5. White (non-Hispanic)	Male			
	Female			
6. Native Hawaiian, Pacific Islander	Male			
	Female			
7. Status not known or other	Male			
	Female			

J. Faculty Age Profile

Complete the following table showing the number of faculty who belong in each of the age categories below.

- Consider only the ________ **permanent full-time faculty** (including those on leave) reported in B2.
- Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.

- The total faculty listed should equal the number reported in B2.

Age	Number of faculty	
	Men	Women
a. Under 30		
b. 30-34		
c. 35-39		
d. 40-44		
e. 45-49		
f. 50-54		
g. 55-59		
h. 60-64		
i. 65-69		
j. 70 and over.................................		

K. Faculty Employment and Mobility

- Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.

K1. How many of the _____ **permanent full-time faculty** members you reported in B2 were newly appointed to a permanent full-time position this year (2010–2011)?

Number of faculty newly appointed on a permanent full-time basis................. ☐

if 0 ⟶ go to K3.

if 1 or more ⟶ go to K2.

K2. Of the faculty members counted in K1, how many had the following as their main activity in the academic year preceding their appointment? Report only **one** main activity per person. The total in K2 should equal _____, the number reported in K1.

a. Attending graduate school... ☐

b. Teaching in a four-year college or university .... ☐

c. Teaching in another two-year college .... ☐

d. Teaching in a secondary school .... ☐

e. Part-time or full-time temporary employment by your college .... ☐

f. Nonacademic employment.. ☐

g. Unemployed.. ☐

h. Status unknown... ☐

K3. How many of your faculty who were **permanent full-time faculty** in the previous year (2009–2010) are no longer part of your **permanent full-time faculty**?... ☐

K. Faculty Employment and Mobility (cont.)

K4. For each newly appointed **permanent full-time faculty** member reported in K1, give the following data. Copy this page to add more faculty if necessary. For each new hire, check one box in each column.

	Gender	Ethnicity/Race	Highest Degree Earned
a. New Hire #1	Male..... ☐ Female ☐	Am. Indian . ☐ Asian .... ☐ Black.......... ☐ Hispanic..... ☐ White .... ☐ Other .... ☐	Bachelor's ....☐ Master's ....☐ Doctorate ....☐
b. New Hire #2	Male..... ☐ Female ☐	Am. Indian . ☐ Asian .... ☐ Black.......... ☐ Hispanic..... ☐ White .... ☐ Other .... ☐	Bachelor's ....☐ Master's ....☐ Doctorate ....☐
c. New Hire #3	Male..... ☐ Female ☐	Am. Indian . ☐ Asian .... ☐ Black.......... ☐ Hispanic..... ☐ White .... ☐ Other .... ☐	Bachelor's ....☐ Master's ....☐ Doctorate ....☐
d. New Hire #4	Male..... ☐ Female ☐	Am. Indian . ☐ Asian .... ☐ Black.......... ☐ Hispanic..... ☐ White .... ☐ Other .... ☐	Bachelor's ....☐ Master's ....☐ Doctorate ....☐
e. New Hire #5	Male..... ☐ Female ☐	Am. Indian . ☐ Asian .... ☐ Black.......... ☐ Hispanic..... ☐ White .... ☐ Other .... ☐	Bachelor's ....☐ Master's ....☐ Doctorate ....☐

L. Professional Activities and Evaluation of Faculty

L1. Is continuing education or professional development required of your faculty?

	Yes	No
Permanent full-time	☐	☐
Part-time.................................	☐	☐

L2. If you answered yes to the applicable row in L1, please estimate the number of faculty reported in B2 and B7 who fulfill the above continuing education or professional development requirement in one or more of the following ways.

	Permanent full-time	Part-time
a. Activities provided by your college or organization at one of its locations		
b. Participation in professional association meetings and mini-courses or other professional association activities..........		
c. Publishing expository or research articles or textbooks.............................		
d. Continuing graduate education.............		
e. Unknown		

L3. In general, how frequently are mathematics faculty evaluated? *(Check one in each row.)*

	At least once a year	At least once every other year	Occasionally	Never	Not applicable
a. Full-time (tenured).............	☐	☐	☐	☐	☐
b. Part-time............................	☐	☐	☐	☐	☐
c. Full-time (non-tenured).......	☐	☐	☐	☐	☐

L. Professional Activities and Evaluation of Faculty (cont.)

L4. Check all evaluation methods that are used for **part-time faculty** paid by your college (reported in B7(a)) or for **permanent full-time faculty** (reported in B2). *(Check yes or no for both part-time and full-time faculty on each line.)*

Evaluation Method	Part-Time Faculty in B7a		Full-Time Faculty in B2	
	Yes	No	Yes	No
a. Observation of classes by other faculty members or department chair	☐	☐	☐	☐
b. Observation of classes by division head (if different from chair) or other administrator	☐	☐	☐	☐
c. Evaluation forms completed by students	☐	☐	☐	☐
d. Evaluation of written course material such as lesson plans, syllabi, or exams	☐	☐	☐	☐
e. Self-evaluation such as teaching portfolios	☐	☐	☐	☐
f. Written peer evaluations	☐	☐	☐	☐
g. Other (specify)	☐	☐	☐	☐

M. Academic Support and Enrichment Opportunities for Students

- Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.

M1. Does your department or college offer a mathematics placement program for entering students?

Yes .... ☐ ⟶ go to M2.

No .... ☐ ⟶ go to M6.

M2. Is some form of placement examination <u>required</u> for first-time enrollees?

Yes .... ☐ ⟶ go to M3.

No .... ☐ ⟶ go to M6.

M3. Is placement in the student's first mathematics course mandatory based on: *(Check one box.)*

Placement test score alone .... ☐

Placement test score and other information .... ☐

Not mandatory .... ☐

M4. Does your college/department periodically assess the effectiveness of the mathematics placement program?

Yes .... ☐ ⟶ go to M5.

No .... ☐ ⟶ go to M6.

M5. What criteria are used to determine effectiveness of the placement program?

	Yes	No
a. Number of students succeeding in the placed course with a grade of "C" and above	☐	☐
b. Success in the next mathematics course after the placed course ..	☐	☐
c. Number of students graduating with associate degree..................	☐	☐
e. Students' homework submitted via an online platform....................	☐	☐
d. Other (specify) ________________________________........	☐	☐

M. Academic Support and Enrichment Opportunities for Students (cont.)

M6. Check all opportunities available to your mathematics students.

	Yes	No
a. Honors sections of mathematics course	☐	☐
b. Mathematics club	☐	☐
c. Special mathematics programs to encourage women	☐	☐
d. Special mathematics programs to encourage minorities	☐	☐
e. Opportunities to compete in mathematics contests	☐	☐
f. Special mathematics lectures/colloquia not part of a mathematics club	☐	☐
g. Mathematics outreach opportunities in local K–12 schools	☐	☐
h. Opportunities to participate in undergraduate research in mathematics	☐	☐
i. Independent study opportunities in mathematics	☐	☐
j. Assigned faculty advisors in mathematics	☐	☐
k. Other (specify)____________________	☐	☐

N. Mathematics Preparation of K–12 Teachers

- Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.

N1. Does your department have any courses or programs directed at preparing current or future teachers to teach mathematics in elementary or secondary school?

Yes .... ☐ ⟶ go to N2.
No .... ☐ ⟶ go to N5.

N2. Does your department have a faculty member assigned to coordinate mathematics program courses for pre-service elementary school teachers?

Yes .... ☐
No .... ☐

N3. Other than the courses "Mathematics for Elementary School Teachers" reported on lines G23, G24, and G25, do you designate any sections of your other mathematics program courses as "especially designed for pre-service elementary school teachers"?

Yes .... ☐
No .... ☐

N4. Which of the following groups can meet their entire mathematics course or licensure requirement for teaching via an organized program in your department? Consider "pre-service" and "career switchers" as distinct categories. "Career switchers" usually are post-baccalaureate older adults returning for teaching licensure after a non-teaching career and often under state-approved special licensure rules. *(Check one on each row.)*

	Yes	No
a. Pre-service elementary school teachers	☐	☐
b. Pre-service middle school teachers	☐	☐
c. Pre-service secondary school teachers....................................	☐	☐
d. In-service elementary school teachers.....................................	☐	☐
e. In-service middle school teachers..	☐	☐
f. In-service secondary school teachers	☐	☐
g. Career switchers moving to elementary school teaching...........	☐	☐
h. Career switchers moving to middle school teaching..................	☐	☐
i. Career switchers moving to secondary school teaching............	☐	☐

N5. Does your institution offer pedagogical courses in mathematics for teacher licensure? *(Check one box.)*

Yes, in our mathematics department .... ☐
Yes, elsewhere in the institution .... ☐
No .... ☐

O. Issues of Professional Concern

O1. Below are problems often cited by two-year college mathematics departments. Please read each item carefully and check the box in each row that best reflects your view.

	Not a problem for us	Minor problem for us	Moderate problem for us	Major problem for us	Not appli-cable
a. Maintaining vitality of faculty	☐	☐	☐	☐	
b. Dual-enrollment (high school and college credit) courses[a]	☐	☐	☐	☐	☐
c. Staffing statistics courses	☐	☐	☐	☐	☐
d. Unrealistic student understanding of the demands of college work	☐	☐	☐	☐	
e. Need to use part-time faculty for too many courses	☐	☐	☐	☐	☐
f. Faculty salaries too low	☐	☐	☐	☐	
g. Class sizes too large	☐	☐	☐	☐	
h. Low student motivation	☐	☐	☐	☐	
i. Too many students needing remediation	☐	☐	☐	☐	
j. Successful progress of students through developmental courses to more advanced mathematics courses	☐	☐	☐	☐	
k. Low success rate in transfer-level courses	☐	☐	☐	☐	
l. Too few students who intend to transfer actually do transfer	☐	☐	☐	☐	
m. Inadequate travel funds for faculty	☐	☐	☐	☐	
n. Inadequate classroom facilities for teaching with technology	☐	☐	☐	☐	
o. Inadequate computer facilities for part-time faculty use	☐	☐	☐	☐	
p. Inadequate computer facilities for student use	☐	☐	☐	☐	

[a] Courses taught in high school by high school teachers for which students may obtain high school credit and simultaneous college credit through your institution.

O. Issues of Professional Concern (cont.)

O1. Continued

	Not a problem for us	Minor problem for us	Moderate problem for us	Major problem for us	Not appli-cable
q. Outsourcing instruction to commercial companies	☐	☐	☐	☐	☐
r. Heavy classroom and other duties prevent personal and teaching enrichment by faculty	☐	☐	☐	☐	
s. Curriculum alignment between high schools and college	☐	☐	☐	☐	
t. Lack of curricular flexibility because of transfer requirements	☐	☐	☐	☐	
u. Other barriers that inhibit curricular changes	☐	☐	☐	☐	
v. Finding time and money for faculty professional development	☐	☐	☐	☐	
w. Maintaining high and consistent expectations of students across different sections of the same course	☐	☐	☐	☐	
x. High cost of textbooks	☐	☐	☐	☐	
y. Lack of flexibility in curricular redesign	☐	☐	☐	☐	☐
z. Maintaining common standards between distance learning courses and related courses	☐	☐	☐	☐	
aa. Use of distance education[b]	☐	☐	☐	☐	☐

[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, computer, programmed instruction, correspondence courses, or other method where the instructor is **not** physically present.

O. Issues of Professional Concern (cont.)

O2. Many departments today use a spectrum of program assessment methods. Please check all that apply to your department's program assessment efforts <u>during the last six years.</u>

	Yes	No
a. We conducted a review of our mathematics program that included one or more reviewers from outside our institution	☐	☐
b. We asked students in our mathematics program to comment on and suggest changes In our program	☐	☐
c. Other departments at our institution were invited to comment on the preparation that their students received in our courses	☐	☐
d. Data on students' progress in subsequent mathematics courses were gathered and analyzed	☐	☐
e. We have a placement system for first-year students, and we gathered and analyzed data on its effectiveness	☐	☐
f. Our department's program assessment activities led to changes in our mathematics program	☐	☐

O. Issues of Professional Concern (cont.)

The next four questions deal with general education requirements at your institution.

O3. Does your institution require all associate's degree graduates to have a quantitative course (which may or may not be within the mathematics department) as part of their general education requirements? *(Check one box.)*

a. Yes, all associate degree's graduates must have such credit ☐ → go to O4.

b. Not (a), but all Associate of Arts or Associate of Science graduates must have credit ☐ → go to O4.

c. Neither (a) or (b) ☐ → go to Section P.

O4. If you chose (a) or (b) in O3, must all students (to whom the quantitative requirement applies) fulfill it by taking a course in your <u>mathematics</u> department?

Yes .... ☐

No .... ☐

O5. What is the lowest level course in your department that can be used to fulfill the general education quantitative requirement in O3? *(Check one box.)*

a. A course below the level of Intermediate Algebra .... ☐

b. Intermediate Algebra or its equivalent, or any course that is more advanced than Intermediate Algebra .... ☐

c. Not Intermediate Algebra, but any course that is more advanced than Intermediate Algebra .... ☐

d. Only certain courses that are more advanced than Intermediate Algebra .... ☐

O6. If you chose O5d, which of the following departmental courses can be used to fulfill the general education quantitative requirement? If you did not choose O5d, omit this question and go to Section P.

Course	Yes	No
a. College Algebra and/or Precalculus	☐	☐
b. Calculus (any course)	☐	☐
c. Introduction to Mathematical Modeling	☐	☐
d. A basic Probability and/or Statistics course.......................................	☐	☐
e. Quantitative Literacy or Liberal Arts Mathematics or Quantitative Reasoning	☐	☐
f. Some other course(s) in our department not listed above	☐	☐

P. Mathematics Enrollments Outside Your Mathematics Department/Program (Fall 2010)

Data to answer the following questions often are beyond the information normally available to a mathematics department chair. Please invest the extra effort needed to give an accurate account of all enrollments in the following courses that are **not** taught in the mathematics department/program. *(Give enrollments, not the number of sections taught.)*

Instructions:

Do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.

Report all enrollments at your campus or in your multi-campus system that are **not** taught in the mathematics department/program (and so are not listed in Section G).

Please consult appropriate sources outside the mathematics program such as schedules, registrar's data, or the heads of these programs to get accurate data on enrollments.

COURSE	Mathematics Enrollments Outside the Mathematics Department			
	Develop-mental Education Department/ Division (a)	Occupational Programs (b)	Business (c)	Other Dept/Division (d)
P1. Arithmetic/Pre-Algebra				
P2. Elementary Algebra (high school level)				
P3. Intermediate Algebra (high school level)				
P4. Business Mathematics				
P5. Statistics/Probability				
P6. Technical Mathematics				

Q. Comments and Suggestions

Q1. If you have found some question(s) difficult to interpret or answer, please let us know. We welcome comments or suggestions to improve future surveys (e.g., CBMS2015).

Comments: ______________________________

Thank you for completing this questionnaire. We know it was a time-consuming process and we hope that the resulting survey report, which we hope to publish in spring 2012, will be of use to you and your department.

Please keep a copy of your responses to this questionnaire in case questions arise.

Appendix VI

Four-Year Statistics Questionnaire

STATISTICS QUESTIONNAIRE

CBMS2010

CONFERENCE BOARD OF THE MATHEMATICAL SCIENCES

SURVEY OF UNDERGRADUATE PROGRAMS IN THE MATHEMATICAL SCIENCES

General Information

Statistics Questionnaire

As part of a random sample, your department has been chosen to participate in the NSF-funded CBMS2010 National Survey of Undergraduate Mathematical Sciences Programs. Even though it is a very complicated survey, the presidents of all U.S. mathematical sciences organizations have endorsed it and ask for your cooperation.

We assure you that no individual departmental data, except the names of responding departments, will be released.

This survey provides data about the nation's undergraduate statistical effort that is available from no other source. You can see the results of a similar survey fielded five years ago by going to www.ams.org/cbms, where the CBMS 2005 report is available online.

All departments in this survey are in universities and colleges that offer at least a bachelor's degree. They may or may not offer an undergraduate major in statistics. Most of the statistics departments in our random sample also offer higher degrees in statistical sciences.

We have classified your department as belonging to a university or four-year college. If this is not correct, please contact Ellen Kirkman, Survey Director, at 336-758-5351 or at Kirkman@wfu.edu.

Please report on undergraduate programs in the statistical sciences (including probability) that are under the direction of your department. Do not include data for other departments or for branches or campuses of your institution that are budgetarily separate from your own. Also, if your department is broader than just statistics (e.g., Department of Statistics and Computer Science or Statistics and Operations Research), please report on all the courses offered by your department.

This survey may be completed either online or using a hard-copy questionnaire. We recommend using the online system because it will do some of the work for you; e.g., it will automatically skip those questions that are not applicable (based on the response you give), gray out portions of questions that do not apply, remind you of previous responses, and provide definitions when you let your cursor hover certain highlighted words.

If you have any questions while filling out this survey form, please call the Survey Director, Ellen Kirkman, at 336-758-5351 or contact her by e-mail at Kirkman@wfu.edu. For help with the online questionnaire, call Westat at 888-248-5017 or send an email to cbms@westat.com.

Please return your completed questionnaire by November 9, 2010, either online or by mailing a hard copy to:

CBMS Survey
Westat
1600 Research Boulevard
Rockville, MD 20850-3129

Please retain a copy of your responses to this questionnaire in case questions arise.

A. General Information

Statistics Questionnaire

A1. Name of your institution: ____________________

A2. Name of your department: ____________________

A3. We have classified your department as being part of a university or four-year college. Do you agree?

Yes................ ☐ → If Yes, go to A4 below.

No .... ☐ → If No, please call Ellen Kirkman, Survey Director, at 336-758-5351.

A4. If your college or university does not recognize tenure, check this box. ☐

A5. Contact person in your department: ☐

A6. Contact person's e-mail address: ☐

A7. Contact person's phone number including area code: ( )

A8. Contact person's mailing address:

a. Street.............................. ☐

b. Street2............................ ☐

c. City .... ☐

d. State.. ☐

e. Zip code .... ☐

B. Dual-Enrollment Courses

Statistics Questionnaire

B1. We use the term dual-enrollment courses to refer to courses conducted on a high school campus and taught by high school teachers, for which high school students may obtain high school credit and, simultaneously, college credit through your institution. Does your department participate in any dual-enrollment programs of this type?

Yes................ ☐ ⟶ If Yes, go to B2.

No .... ☐ ⟶ If No, go to B6.

B2. Please complete the following table concerning your dual-enrollment program (as defined above) for the previous term (spring 2010) and the current fall term of 2010.

Course	Total Dual Enrollments	
	Last Term= Spring 2010	This Term= Fall 2010
a. Statistics....................		
b. Other.........................		

B3. For the dual-enrollment courses in B2, to what extent are the following the responsibility of your department? *(Choose one on each line.)*

	Never Our Responsibility	Sometimes Our Responsibility	Always Our Responsibility
a. Choice of textbook......................	☐	☐	☐
b. Design/approval of syllabus.........	☐	☐	☐
c. Design of final exam...................	☐	☐	☐
d. Choice of instructor.....................	☐	☐	☐

B4. Does your department have a teaching evaluation program in which your part-time department faculty are required to participate?

Yes................ ☐ ⟶ If Yes, go to B5.

No .... ☐ ⟶ If No, go to B6.

B5. Are instructors in the dual-enrollment courses reported in B2 required to participate in the teaching evaluation program for part-time departmental faculty described in B4?

Yes.................. ☐

No.................... ☐

B. Dual-Enrollment Courses (continued)

Statistics Questionnaire

B6. Does your department assign any of its own full-time or part-time faculty to teach courses conducted on a high school campus for which high school students may receive both high school and college credit (through your institution)?

Yes .... ☐ → If Yes, go to B7.

No .... ☐ → If No, go to Section C.

B7. How many students are enrolled in the courses conducted on a high school campus and taught by your full-time or part-time faculty and through which high school students may receive both high school and college credit (through your institution)?

Number of students............................ ☐

In subsequent sections we ask about course enrollments in your department; please ***do not*** *include any of the enrollments reported in this Section B.*

C. Distance Learning

Statistics Questionnaire

Definition: Distance learning courses are those courses in which the majority of the instruction occurs with the instructor and the students separated by time and /or place (e.g., courses in which the majority of the course is taught online, by computer software, by television, or by correspondence).

C1. Does your department offer distance learning courses?

Yes................ ☐

No .... ☐ → If No, skip to D1.

C2. Which best characterizes the format/structure of the majority of your distance learning courses?

All instruction is conducted without an instructor being physically present .... ☐
Some instruction is conducted with an instructor being physically present....... ☐

C3. Which one response best describes the general pattern for how the instructional materials used in your distance learning courses are determined?

Course instructors create materials... ☐
Course instructors choose commercially produced materials........ ☐
Course instructors choose a combination of both......................... ☐

C4. In most of your distance learning courses, how are the majority of the tests administered? *(Choose one response.)*

Not at a monitored testing site (e.g., online or by correspondence).......... ☐
At a monitored testing site.. ☐
Combination of both.. ☐

C5. Does your institution give statistics credit for distance learning courses that are not offered through your department?

Yes................................ ☐

No .... ☐

No department policy...... ☐

C. Distance Learning (continued)

C6. Are there any courses that you offer in both non-distance learning and in distance learning formats?

Yes .... ☐ ⟶ If Yes, go to C7 below.

No .... ☐ ⟶ If No, go to D1.

C7. Are the content, goals, and objectives of the distance learning courses generally the same as those in the non-distance learning courses of the same title?

Yes .... ☐

No .... ☐

C8. Do the course instructors in your distance learning courses generally:

	Yes	No
a. Hold office hours to meet with students on campus as in comparable non-distance learning courses taught on campus?..	☐	☐
b. Participate in evaluation of instruction in the same way as faculty who teach comparable non-distance learning courses?...	☐	☐

C9. Which, if any, of the following practices apply to the majority of distance learning courses in your department? *(Check one response on each line.)*

	Yes	No
a. Same examinations as in the non-distance-learning course......	☐	☐
b. Same common course outlines as in the non-distance-learning course...	☐	☐
c. Same course projects as in the non-distance-learning course...	☐	☐

D. Faculty Profile (Fall 2010)

Statistics Questionnaire

Please indicate whether the following types of faculty are actively teaching one or more courses in fall 2010.

Definitions

- **Full-time faculty.** Faculty who are full-time employees in the institution and more than half-time in the department. For example, if a tenured physics professor with a joint appointment in your department teaches a total of two courses in fall 2010, with exactly one being in your department, then that person would be counted as part-time in your department.

- **Permanent faculty.** If your institution does not recognize tenure, please report full-time departmental faculty who are permanent on line D1a and report all other faculty on the remaining lines as appropriate.

Faculty Type	Teach in Fall 2010	
	Yes	No
D1. Full-time faculty		
a. Tenured, tenure-eligible, or permanent faculty	☐	☐
b. Other full-time faculty	☐	☐
D2. Part-time faculty	☐	☐
D3. Graduate teaching assistants who teach courses independently (not counting the teaching of recitation sessions)	☐	☐

E. Probability and Statistics Courses (Fall 2010)

In the next several pages, you will enter data about courses you are teaching. For each course that is taught, you will be asked to enter the fall 2010 enrollment and the number of sections of the course. Depending upon the type of course, you will be asked about distance learning enrollment and the numbers of each kind of faculty (tenure-eligible, part-time, etc.) who are teaching the course. Also, you may not teach some of your advanced courses in every term; for those courses we also ask whether the course was offered in spring 2010 or will be offered in spring 2011 (please combine the winter and spring terms if your institution uses the quarter system); please answer these questions regardless of whether you offer the courses in fall 2010.

The following instructions apply throughout Section E (pages 8-11).

- Report distance learning enrollments separately from other enrollments. A *distance learning* course is one in which the majority of instruction occurs with the instructor and the students separated by time and place (e.g., courses in which the majority of the course is taught online or by computer software or correspondence).
- Do NOT include any dual-enrollment sections or enrollments in these tables. (In this questionnaire, a *dual-enrollment* section is one that is conducted on a high school campus, taught by a high school teacher, and allows students to receive high school credit and, simultaneously, college credit from your institution for the course. These courses were reported in Section B.)
- For Introductory Statistics classes, you will be asked to list separately classes taught in a large lecture format (with recitation sections) and classes taught by a single instructor (these classes are further broken down by enrollment of 30 or less and enrollment over 30). For example, you will be asked for both the number of large lecture courses (E1-1 column c) and the total number of recitation sections for all the large lectures (E1-2 column c). For all courses except as marked in E1 and E2, please do not treat recitation sessions as separate sections. Instead, please treat both the lecture component and any associated recitation sessions as a single section.
- Report a section of a course as being taught by a *graduate teaching assistant (GTA)* if and only if that section is taught *independently* by the GTA, i.e., when it is the GTA's own course and the GTA is the instructor of record.
- If your institution does not recognize tenure, report sections taught by your permanent full-time faculty in column (d) and sections taught by other full-time faculty in column (e).
- Full-time faculty teaching in your department and holding joint appointments with other departments should be counted in column (d) if they are tenured, tenure-eligible, or permanent in your department. Faculty who are not tenured, tenure-eligible, or permanent in your department should be counted in column (f) if their fall 2010 teaching in your department is less than or equal to 50% of their total fall teaching assignment, and they should be reported in column (e) otherwise. (Example: If a tenured physics professor with a joint appointment in your department teaches a total of two courses in fall 2010, with exactly one being in your department, then that person would be counted as part-time in your department.)
- Do not fill in any shaded boxes.
- Any unshaded box that is left blank will be interpreted as reporting a count of zero.
- Except where specifically stated to the contrary, the tables in Section E deal with enrollments in fall term 2010.
- If a section is co-taught by multiple faculty, categorize the section in terms of the most senior faculty member teaching that course.
- If your department is broader than just statistics (e.g., Department of Statistics and Computer Science or Statistics and Operations Research), please use E24 to report on the courses outside of probability and statistics.
- If a course is cross-listed in both statistics and another department (such as mathematics, psychology, or engineering), count all students regardless of how the course is listed on the students' transcripts.

E. Probability and Statistics Courses (Fall 2010)

♦ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time faculty[3] Tenured, tenure-eligible, or permanent faculty (d)	Full-time faculty[3] Other full-time faculty with Ph.D. (e)	Full-time faculty[3] Other full-time faculty without Ph.D. (f)	Part-time faculty (g)	Graduate teaching assistants[4] (h)
STATISTICS								
COURSES FOR NON-MAJORS/MINORS								
E1: Introductory Statistics (no calculus prerequisite)								
E1-1. Lecture with separately scheduled recitation/problem/ laboratory sessions[5]								
E1-2. Number of recitation/problem/ laboratory sessions associated with courses reported in E1-1[6]								
E1-3. Other sections with enrollment of 30 or less								
E1-4. Other sections with enrollment above 30								

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual-enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.
[3] Count faculty with joint appointments in column (d) or (e) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.
[4] Sections taught independently by GTAs .
[5] Report an introductory statistics class along with its recitation/problem/laboratory sessions as one section in column (c) of E1-1 and E2-1.
[6] Example: suppose your department offers four 100-student sections of a course and that each is divided into five 20-student discussion sessions that meet separately from the lectures. Report 4*5=20 recitation/problem/laboratory sessions associated with the course, even if each discussion meets several times per week.

Please refer to the course reporting instructions at the beginning of Section E.

♦ **Cells left blank will be interpreted as zeros** .

Name of Course (or equivalent)	Total distance education enrollments[1] (a)	Total enrollment NOT in distance education and NOT dual enrollments[2] (b)	Number of sections corres-ponding to column (b) (c)	Of the number in column (c), how many sections are taught by: Full-time faculty[3] Tenured, tenure-eligible, or permanent faculty (d)	Other full-time faculty with Ph.D. (e)	Other full-time faculty without Ph.D. (f)	Part-time faculty (g)	Graduate teaching assistants[4] (h)
STATISTICS								
COURSES FOR NON-MAJORS/MINORS								
E2: Introductory Statistics (calculus prerequisite) (for non-majors)								
E2-1. Lecture with separately scheduled recitation/problem/ laboratory sessions[5]								
E2-2. Number of recitation/problem/ laboratory sessions associated with courses reported in E2-1[6]								
E2-3. Other sections with enrollment of 30 or less								
E2-4. Other sections with enrollment above 30								
Other Introductory Statistics Courses								
E3. Statistics for pre-service elementary or middle grade teachers								
E4. Statistics for pre-service high school teachers								
E5. All other elementary-level statistics courses								

[1] A majority of students receive the majority of their instruction via Internet, TV, correspondence courses, or other method where the instructor is NOT physically present.
[2] Do not include any dual-enrollment courses, i.e., courses taught on a high school campus by a high school instructor for which high school students may obtain both high school credit and, simultaneously, college credit through your institution.
[3] Count faculty with joint appointments in column (d) or (e) if more than 50 percent of their fall 2010 teaching assignments are within your department, and in column (f) otherwise.
[4] Sections taught independently by GTAs.
[5] Report an introductory statistics class along with its recitation/problem/laboratory sessions as one section in column (c) of E1-1 and E2-1.
[6] Example: suppose your department offers four 100-student sections of a course and that each is divided into five 20-student discussion sessions that meet separately from the lectures. Report 4*5=20 recitation/problem/laboratory sessions associated with the course, even if each discussion meets several times per week.

E. Probability and Statistics Courses (Fall 2010) (continued)

Statistics Questionnaire

♦ **Cells left blank will be interpreted as zeros.**

Name of Course (or equivalent)	Total enrollment fall 2010 (a)	Number of sections corresponding to column (a) (b)	Number of sections corresponding to column (b) taught by tenured, tenure-eligible, or permanent faculty (c)	Was this course taught in ANY term of the previous academic year? (d)		Will this course be offered in the next term (spring 2011)? (e)	
PROBABILITY & STATISTICS							
COURSES FOR MAJORS OR MINORS				Yes	No	Yes	No
E6. Mathematical Statistics (calculus prerequisite)				☐	☐	☐	☐
E7. Probability (calculus prerequisite)				☐	☐	☐	☐
E8. Combined Probability & Statistics (calculus prerequisite)				☐	☐	☐	☐
E9. Stochastic Processes				☐	☐	☐	☐
E10. Applied Statistical Analysis				☐	☐	☐	☐
E11. Design & Analysis of Experiments				☐	☐	☐	☐
E12. Regression (and Correlation)				☐	☐	☐	☐
E13. Biostatistics				☐	☐	☐	☐
E14. Nonparametric Statistics				☐	☐	☐	☐
E15. Categorical Data Analysis				☐	☐	☐	☐
E16. Sample Survey Design & Analysis				☐	☐	☐	☐
E17. Statistical Computing				☐	☐	☐	☐
E18. Data Management				☐	☐	☐	☐
E19. Senior Seminar/Independent Studies				☐	☐	☐	☐
E20. Bayesian Statistics				☐	☐	☐	☐
E21. Statistical Consulting				☐	☐	☐	☐
E22. Statistical Software				☐	☐	☐	☐
E23. All other upper level Probability & Statistics							
E24. All departmental courses other than Probability or Statistics							

E25. Do you offer any advanced undergraduate courses in statistics (E6-E23) as distance-learning courses?

Yes .... ☐ ⟶ If Yes, go to E26 below.

No .... ☐ ⟶ If No, go to Section F.

E26. Please indicate which advanced undergraduate statistics courses you offer as distance-learning courses. (Check all that apply.)

Course	**Offer as distance learning**
E6. Mathematical Statistics (calculus prerequisite)	☐
E7. Probability (calculus prerequisite)	☐
E8. Combined Probability & Statistics (calculus prerequisite)	☐
E9. Stochastic Processes	☐
E10. Applied Statistical Analysis	☐
E11. Design & Analysis of Experiments	☐
E12. Regression (and Correlation)	☐
E13. Biostatistics	☐
E14. Nonparametric Statistics	☐
E15. Categorical Data Analysis	☐
E16. Sample Survey Design & Analysis	☐
E17. Statistical Computing	☐
E18. Data Management	☐
E19. Senior Seminar/ Independent Studies	☐
E20. Bayesian Statistics	☐
E21. Statistical Consulting	☐
E22. Statistical Software	☐
E23. Other upper level Probability & Statistics	☐
E23. Other mathematical science courses	☐

F. Undergraduate Program (Fall 2010)

Statistics Questionnaire

F1. Report the total number of your departmental majors who received their bachelor's degrees from your institution between July 1, 2009, and June 30, 2010. Include joint majors and double majors[1] .... ☐

F2. Of the undergraduate degrees described in F1, please report the number who majored in each of the following categories. Each student should be reported only once. Include all double and joint majors[1] in your totals. Use the Other category for a major in your department who does not fit into one of the earlier categories.

Area of Major	Male	Female
a. Statistics		
b. Biostatistics..		
c. Actuarial Science		
d. Joint[1] Statistics and Computer Science		
e. Joint[1] Statistics and Mathematics.............................		
f. Joint[1] Statistics and (Business or Economics).....		
g. Statistics Education..		
h. Other		

[1] A "double major" is a student who completes the degree requirements of two separate majors, one in statistics and one in another program or department. A "joint major" is a student who completes a single major in your department that integrates courses from statistics and some other program or department and typically requires fewer credit hours that the sum of the credit hours required by the separate majors.

F3. How many different courses at your institution offered during spring 2010 or fall 2010 are team taught by a member(s) of your department and a member(s) of another department?... ☐

F. Undergraduate Program (Fall 2010) (continued)

F4. To what extent must majors in your department complete the following? Check one box in each row.

	Required of all majors	Required of some but not all majors	Not required of any major
a. Calculus I	☐	☐	☐
b. Calculus II	☐	☐	☐
c. Multivariable Calculus	☐	☐	☐
d. Linear Algebra/Matrix Theory	☐	☐	☐
e. At least one computer science course	☐	☐	☐
f. At least one applied mathematics course (not including a, b, c, d above)	☐	☐	☐
g. A capstone experience (e.g., a senior project, a senior thesis, a senior seminar, or an internship)	☐	☐	☐
h. An exit exam (written or oral)	☐	☐	☐
i. One Probability course	☐	☐	☐
j. One Mathematical Statistics course	☐	☐	☐
k. One Linear Models course	☐	☐	☐
l. One Bayesian Inference course	☐	☐	☐

F. Undergraduate Program (Fall 2010) (continued)

Statistics Questionnaire

F5. Many departments today use a spectrum of program-assessment methods. Please indicate whether each of the following apply to your department's undergraduate program-assessment efforts during the last six years.

	Yes	No
a. We conducted a review of our undergraduate program that included one or more reviewers from outside of our institution	☐	☐
b. We asked graduates of our undergraduate program to comment on and suggest changes in our undergraduate program.......................	☐	☐
c. Other departments at our institution were invited to comment on the preparation that their students received in our courses	☐	☐
d. Data on our students' progress in subsequent statistics courses were gathered and analyzed	☐	☐
e. We have a placement system for first-year students and we gathered and analyzed data on its effectiveness	☐	☐
f. Our department's program assessment activities led to changes in our undergraduate program...	☐	☐

F6. For each of the following opportunities, indicate whether or not it is available to your undergraduate statistics students

	Yes	No
a. Honors sections of departmental courses	☐	☐
b. An undergraduate statistics club	☐	☐
c. Special statistics programs to encourage women.............................	☐	☐
d. Special statistics programs to encourage minorities.........................	☐	☐
e. Opportunities to participate in statistics contests..............................	☐	☐
f. Special statistics lectures/colloquia not part of a statistics club	☐	☐
g. Statistics outreach opportunities in local K–12 schools....................	☐	☐
h. Undergraduate research opportunities in statistics...........................	☐	☐
i. Independent study opportunities in statistics....................................	☐	☐
j. Assigned faculty advisers in statistics...	☐	☐
k. Opportunity to write a senior thesis in statistics................................	☐	☐
l. A career day for statistics majors..	☐	☐
m. Special advising about graduate school opportunities in statistical sciences	☐	☐
n. Opportunity for an internship experience or part-time employment in a professional statistical opportunity	☐	☐
o. Opportunity to participate in a senior seminar	☐	☐
p. Supervised consultation working in a consulting lab with clients	☐	☐

F. Undergraduate Program (Fall 2010) (continued)

Statistics Questionnaire

F7. Please give your best estimate of the percentage of your department's graduating majors from the previous academic year (reported in F1) in each of the following categories. Please make the totals add to 100 percent. If you do not offer any mathematical sciences major, check here ☐ and go to F8.

a. Who went into pre-college teaching .... %

b. Who went to graduate school in the statistical sciences .... %

c. Who went to professional school or to graduate school outside of the statistical sciences %

d. Who took jobs in business, industry, government, etc. .... %

e. Who had other post-graduation plans known to the department .... %

f. Whose plans are not known to the department .... %

F8. Responses to this question will be used to project total enrollment in the current (2010–2011) academic year based on the pattern of your departmental enrollments in 2009–2010. Do NOT include any numbers from dual-enrollment courses[1] in answering question A4. Please provide head counts, not full-time equivalents.

a. Previous fall (2009) total student enrollment in <u>your department's</u> undergraduate courses (remember: do not include dual-enrollment courses[1]): ....

b. Previous academic year (2009–2010) total enrollment in <u>your department's</u> undergraduate courses, <u>excluding</u> dual enrollments[1] and <u>excluding</u> enrollments in summer school 2010: ....

c. Total enrollment in <u>your department's</u> undergraduate courses in summer school 2010: ....

[1] In this question, the term "dual enrollment courses" is used to mean courses taught on a high school campus, by high school teachers, for which high school students may obtain high school credit and, simultaneously, college credit through your institution.

F9.

a. How many freshmen enrolled in your institution in fall 2010? ....

b. How many of these freshmen entered with AP credit for Statistics? ....

G. Introductory Statistics Instruction

The following questions are about instruction in course E1: Introductory Statistics for non-majors/minors (no calculus prerequisite) on page 9.

G1. In most sections of course E1, the percentage of class sessions in which real data are used is generally approximately:

0-20% .... ☐
21-40% .... ☐
41-60% .... ☐
61-80% .... ☐
81-100% .... ☐

G2. In most sections of course E1, the percentage of class sessions in which in-class demonstrations and/or in-class problem solving activities/discussions generally take place is approximately:

0-20% .... ☐
21-40% .... ☐
41-60% .... ☐
61-80% .... ☐
81-100% .... ☐

G3. Which, if any, of the following kinds of technology are used in the majority of sections of course(s) E1?

	Yes	No
a. Graphing calculators	☐	☐
b. Statistical packages (e.g., SAS, SPSS, Minitab)	☐	☐
c. Educational software	☐	☐
d. Applets	☐	☐
e. Spreadsheets	☐	☐
f. Web-based resources including data sources, on-line texts, and data analysis routines	☐	☐
g. Classroom response systems (e.g., clickers)	☐	☐

G4. Do the majority of the sections of course(s) E1 require assessments beyond homework exams, and quizzes (assessments such as projects, oral presentations, written reports)?

Yes .... ☐

No .... ☐

H. Comments and Suggestions

Statistics Questionnaire

If you found some question(s) difficult to interpret or answer, please let us know. We welcome suggestions to improve future surveys (e.g., CBMS 2015).

Comments: ____________________

Thank you for completing this questionnaire. We know it was a time-consuming process and we hope that the resulting survey report, which we hope to publish in spring 2012, will be of use to you and your department.

Please keep a copy of your responses to this questionnaire in case questions arise.

Appendix VII

Tables of Standard Errors

Table S.1	Four-year	SE	Two-year	SE
Mathematics	1971	*73*	1887	*103*
Statistics	371	*16*	137	*12*
Computer Science	77	*11*	na	
Total	2419	*82*	2024	*109*

Table S.2	Math. Dept.	SE	Stat. Dept.	SE	TYC	SE
Precollege	209	*22*			1150	*86*
Introductory	863	*35*			368	*31*
Calculus level	748	*35*			138	*10*
Advanced	150	*7*			0	-
Other (Two-year only)					231	*12*
Total Mathematics	1971	*73*			1887	*103*
Statistics						
Elementary	231	*16*	81	*6*	137	*25*
Upper level	32	*3*	27	*5*	0	-
Total Stat	262	*16*	108	*7*	137	*25*
CS						
Lower	56	*9*				
Middle	12	*2*				
Upper	10	*2*				
Total	77	*11*				
Grand Total	2310	*82*	108	*7*	2024	*111*

Table S.3	Four-year	*SE*
Math	12468	*978*
Math Ed	3614	*433*
Statistics	856	*61*
Actuarial	849	*117*
All Joint Majors (comb.)	1222	*258*
Math & CS		
Math & Stat		
Math/Stat & Bus. or Econ.		
Other	231	*63*
Total M, S, Jt. degrees	19241	*1100*
Women	8692	*685*
CS degrees	2137	*389*
Women	394	*80*
Total degrees	21377	*1180*
Women	9086	*688*

Table S.4	TTE	*SE*	OFT	*SE*	PT	*SE*	GTA	*SE*	UNKN	*SE*	Enroll	*SE*
Math Depts												
Math courses	47	*2*	16	*1*	20	*2*	6	*0*	11	*2*	1928	*71*
Stat Courses	60	*2*	9	*1*	14	*2*	3	*1*	13	*2*	250	*16*
CS Courses	60	*5*	17	*5*	21	*6*	1	*0*	2	*1*	73	*11*
All Math Dept	49	*2*	15	*1*	19	*2*	6	*0*	11	*2*	2251	*81*
Stat Depts												
All Stat courses	49	*3*	11	*1*	8	*1*	10	*1*	22	*2*	105	*5*
TYC												
All courses	54	*na*			46	*5*					1836	*103*

Table S.5	TTE	SE	OFT	SE	PT	SE	GTA	SE	UNKN	SE	Enroll	SE
Math, Precollege	18	3	20	4	44	4	9	2	9	2	201	22
Math, Intro	32	2	22	2	27	2	8	1	10	1	834	34
Math, Calculus	59	3	15	1	12	3	7	1	8	2	743	35
Math, Upper level	78	8	-		-		-		23	8	150	7
Math, Elem level stat	48	2	14	1	22	3	4	1	12	3	218	16
Math, Upper level stat	77	6	-		-		-		23	6	32	3
Math, CS Lower level	50	5	17	5	29	7	1	1	3	1	52	8
Stat Dept, Elem level	33	3	17	2	12	1	15	2	23	3	81	6
Stat Dept, Upper level	79	2	-		-		-		21	2	27	5
TYC, All	54	na			46	5					1836	103

Standard Error Table for S.6

Table S.6	TTE	SE	OFT	SE	PT	SE	GTA	SE	UNKN	SE	Enroll	SE	Avg Sect	SE
MS Calc I														
Lect/Recit	46	8	19	4	20	11	9	2	7	3	107	14	50	3
Reg < 31	65	3	18	2	11	3	3	1	4	1	49	5	21	1
Reg > 30	48	5	16	3	14	3	9	3	12	5	78	8	36	1
MS Calc I Total	53	4	18	2	15	4	7	1	8	3	234	14	35	1
MS Calc II														
Lect/Recit	50	10	15	6	27	17	4	2	4	2	61	13	51	4
Reg < 31	76	4	9	2	5	2	4	1	6	2	22	3	19	1
Reg > 30	52	7	17	3	5	1	13	8	13	7	45	5	37	1
MS Calc II Total	59	6	14	2	12	7	7	3	8	3	128	14	36	1
Total I & II	55	4	16	2	14	5	7	1	8	3	362	27	35	1
TYC	Full-time				Part-time									
MS Calc I	90	3			10	3					63	4	20	6
MS Calc II	86	3			14	3					29	2	24	1
Total I & II	89	3			11	3					93	6	21	4

Table S.7	TTE	SE	OFT	SE	PT	SE	GTA	SE	UNKN	SE	Enroll	SE	Avg Sect	SE
NMS Calc I														
Lect/Recit	35	*5*	30	*5*	20	*4*	9	*3*	7	*2*	34	*4*	56	*5*
Reg < 31	33	*6*	18	*5*	23	*6*	15	*8*	11	*4*	17	*2*	24	*1*
Reg > 30	27	*4*	24	*5*	24	*4*	11	*2*	14	*6*	48	*6*	45	*3*
NMS Calc I Total	31	*3*	24	*3*	23	*3*	12	*3*	11	*3*	99	*6*	42	*2*
NMS Calc II	34	*6*	15	*4*	17	*5*	11	*4*	22	*9*	22	*3*	29	*4*
NMS Calc I & II	31	*3*	22	*3*	21	*3*	12	*3*	14	*3*	121	*8*	39	*2*
TYC	Full-time				Part-time									
NMS Calc I	75	*8*			25	*8*					19	*3*	21	*5*
NMS Calc II	50	*17*			50	*17*					2	*1*	27	*3*
Total I & II	73	*8*			27	*8*					21	*3*	21	*4*

Table S.8 Math Depts	T/TE	SE	OFT	SE	PT	SE	GTA	SE	UNKN	SE	Enroll	SE	Avg Sect	SE
Intro Stat (F1)														
Lect/Recit	46	*5*	6	*2*	27	*10*	2	*1*	19	*8*	47	*13*	33	*3*
Reg < 31	46	*5*	17	*4*	26	*5*	2	*1*	9	*3*	54	*7*	22	*1*
Reg > 30	46	*4*	18	*3*	17	*3*	8	*2*	12	*2*	74	*9*	45	*3*
Course Total	46	*2*	15	*1*	24	*3*	4	*1*	12	*3*	174	*16*	31	*1*
Intro Stat (F2)														
Lect/Recit	59	*10*	21	*6*	8	*7*	2	*2*	9	*8*	8	*3*	25	*1*
Reg < 31	70	*9*	8	*6*	12	*4*	3	*2*	7	*7*	6	*1*	15	*2*
Reg > 30	49	*8*	23	*9*	10	*7*	19	*8*	0	*0*	9	*2*	38	*4*
Course Total	61	*6*	16	*4*	10	*3*	7	*2*	6	*6*	23	*4*	24	*1*
Prob & Stat (F3) Course Total	41	*7*	8	*3*	26	*9*	9	*4*	16	*6*	18	*4*	32	*3*
Other Prob & Stat (F4) Course Total	71	*14*	12	*5*	0	*0*	6	*5*	12	*11*	3	*1*	27	*4*
Total All Elem. Prob & Stat	48	*2*	14	*1*	22	*3*	4	*1*	12	*3*	218	*16*	30	*1*
TYC	Full-time				Part-time									
Elem Stat	61	*3*			39	*3*					114	*9*	28	*1*

Table S.9 Stat Depts	T/TE	*SE*	OFT	*SE*	PT	*SE*	GTA	*SE*	UNKN	*SE*	Enroll	*SE*	Avg Sect	*SE*
Intro Stat (no calc) (E1)														
Lect/Recit	21	*2*	20	*2*	13	*2*	14	*4*	31	*6*	38	*3*	61	*6*
Reg < 31	44	*8*	25	*8*	20	*5*	4	*3*	7	*4*	5	*2*	23	*4*
Reg > 30	33	*7*	9	*3*	11	*3*	25	*6*	21	*5*	13	*2*	40	*2*
Course Total	29	*3*	18	*2*	14	*1*	16	*3*	24	*4*	56	*4*	47	*3*
Intro Stat (calc prereq) (E2)														
Lect/Recit	35	*4*	21	*3*	9	*2*	10	*3*	25	*3*	7	*1*	46	*5*
Reg < 31	47	*11*	11	*3*	3	*1*	8	*3*	31	*10*	4	*1*	27	*7*
Reg > 30	47	*4*	13	*2*	15	*4*	14	*3*	11	*2*	5	*0*	37	*3*
Course Total	43	*4*	15	*2*	9	*1*	11	*2*	23	*3*	16	*2*	37	*3*

Table S.10	Computer algebra systems	*SE*	Commercial packages	*SE*	Mostly lecture	*SE*	Enroll	*SE*	Avg Sect	*SE*
MS Calc I	9	*3*	12	*5*	66	*18*	63	*4*	20	*6*
MS Calc II	9	*3*	11	*3*	85	*5*	29	*2*	24	*1*
Total MS Calc I & II	9	*2*	12	*4*	71	*13*	93	*6*	21	*4*

Table S.11	Computer algebra systems	*SE*	Commercial packages	*SE*	Mostly lecture	*SE*	Enroll	*SE*	Avg Sect	*SE*
NMS Calc I	0	*0*	22	*10*	72	*15*	19	*3*	21	*5*
NMS Calc II	0	*0*	0	*0*	84	*8*	2	*1*	27	*3*
Total NMS Calc I & II	0	*0*	20	*9*	73	*14*	21	*3*	21	*4*

Table S.12	Computer algebra systems	*SE*	Commercial packages	*SE*	Mostly lecture	*SE*	Enroll	*SE*	Avg Sect	*SE*
Elementary Statistics	2	*1*	19	*5*	81	*5*	114	*9*	28	*1*

Table S.13 (A)	% of Math Depts.	*SE*	% of Stat Depts.	*SE*
Offer elementary statistics course with no calculus prerequisite	84	*3*	88	*3*
Percentage of class sessions in which real data is used is:				
0-20%	18	*4*	9	*3*
21-40%	27	*4*	17	*3*
41-60%	19	*4*	16	*3*
61-80%	16	*4*	20	*3*
81-100%	20	*4*	38	*4*
Percentage of class sessions in which in-class demonstrations or problem solving activities take place is:				
0-20%	14	*2*	19	*3*
21-40%	29	*5*	22	*4*
41-60%	13	*3*	16	*3*
61-80%	25	*4*	17	*3*
81-100%	19	*3*	26	*4*
Majority of sections use the following kinds of technology:				
Graphing calculators	71	*4*	43	*4*
Statistical packages	55	*4*	87	*3*
Educational software	19	*3*	40	*4*
Applets	17	*4*	34	*4*
Spreadsheets	51	*5*	48	*4*
Web-based resources	54	*7*	74	*4*
Classroom response systems	10	*3*	29	*4*
Percentage of departments where the majority of sections require assessments beyond homework, exams, and quizzes	45	*5*	36	*4*

Table 13 (B) Practices used in teaching College Algebra	Percentage of all sections, nationally	*SE*	Mean of department-reported percentages	*SE*
a. Emphasize problem solving in the modeling sense	44	*5*	53	*5*
b. Include elementary data analysis	27	*5*	26	*6*
c. Include writing assignments	16	*3*	23	*5*
d. Include small group activities	36	*5*	42	*6*
e. Include small group projects	20	*5*	22	*6*
f. Include class presentations	9	*3*	12	*4*
g. Use graphing calculators	66	*5*	72	*4*
h. Use spreadsheets	5	*3*	8	*5*
i. Use online homework generating and grading packages	68	*4*	58	*6*
j. Use classroom response systems (e.g., clickers)	9	*3*	8	*4*
k. Primarily use a traditional approach	65	*5*	70	*4*

Table S.14	2010	SE
Math Depts		
FT faculty	22293	*562*
PT faculty	6050	*306*
Stat Depts (PhD)		
FT faculty	1004	*19*
PT faculty	105	*8*
TYC		
FT faculty	10873	*602*
PT faculty	23453	*1592*

Table S.15	Total	SE	T&TE	SE	OFT	SE	Post doc	SE
Math Depts								
Full-time	22293	*562*	16364	373	5929	380	1025	23
with PhD	18249	402	15646	365	2603	136	1024	23
w/o PhD	4044	286	717	93	3326	280	1	1
Stat (PhD)								
Full-time	1004	19	789	14	215	9	71	6
with PhD	969	19	786	14	184	8	71	6
TYC	Total FT	SE	FT Perm	SE	FT Temp	SE		
FT Faculty	10873	*602*	9790	*387*	1083	*417*		

Table S.16	Total	SE	T	SE	TE	SE	OFT	SE	PD	SE
Math Depts										
FT faculty	22293	*562*	12747	*315*	3617	*141*	5929	*380*	1025	*23*
# Women	6416	*194*	2740	*131*	1227	*77*	2449	*126*	233	*6*
Stat Depts (PhD)										
FT faculty	1004	*19*	580	*12*	209	*6*	215	*9*	71	*6*
# Women	261	*7*	95	*3*	84	*3*	82	*4*	18	*2*
TYC	All	SE	FT < 40	SE						
FT faculty	9790	*387*	3244	*313*						
# Women	4924	*278*	1764	*223*						

Table S.17	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69
Ages, Math total %	2	9	12	12	14	13	13	12	8	4
SE	*0*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*0*	*0*
TYC	<30	30-34	35-39	40-44	45-49	50-54	55-59	>59	Avg	
Perm fac ages %	8	9	12	14	15	11	13	17	46.8	
SE	*2*	*1*	*1*	*2*	*1*	*1*	*1*	*2*	-	

Table S.18	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69
Ages, Stat total %	3	14	17	13	10	9	12	12	6	4
SE	*0*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*0*

Table S.19	Asian	Black	Hisp.	White	Other
FT men %	9	2	2	56	2
SE	*0*	*0*	*0*	*1*	*0*
FT women %	3	1	1	23	1
SE	*0*	*0*	*0*	*1*	*0*

Table S.20	Asian	Black	Hisp.	White	Other
FT men %	20	1	1	49	3
SE	*1*	*0*	*0*	*1*	*0*
FT women %	8	0	1	15	2
SE	*1*	*0*	*0*	*1*	*0*

Table S.21	D&Ret	*SE*	Number	*SE*
PhD Math	146	*5*	5615	*27*
MA Math	91	*9*	3209	*47*
BA Math	123	*28*	7540	*369*
Total Math	360	*30*	16364	*373*
Total Doc Stat	15	*3*	789	*14*

Table SP.1	% Have K-8	*SE*	% have math certification	*SE*
Univ (PhD)	62	*3*	79	*3*
Univ (MA)	90	*5*	96	*3*
Coll (BA)	70	*5*	80	*5*
Math Total	72	*4*	82	*3*

Table SP.2	Percentage of TYCs with an organized program in which students can complete their entire mathematics course or licensure requirements	*SE*
Pre-service elementary teachers	41	*8*
Pre-service middle school teachers	24	*8*
Pre-service secondary teachers	13	*4*
In-service elementary teachers	25	*6*
In-service middle school teachers	12	*4*
In-service secondary teachers	10	*4*
Career-switchers aiming for elementary teaching	30	*6*
Career-switchers aiming for middle school teaching	17	*4*
Career-switchers aiming for secondary teaching	13	*4*

Table SP.3		Univ (PhD) %	*SE*	Univ (MA) %	*SE*	College (BA) %	*SE*	All Math Depts %	*SE*
Dept. offers a K-8 certification program.		62	*3*	90	*5*	70	*5*	72	*4*
Dept. offers program for "math specialists" in any K-8 grades.		36	*5*	27	*9*	21	*8*	24	*6*
	Of those departments that offer a program for "math specialists" in any K-8 grade, the percentage of depts offering a program for "math specialists" in early elementary grades.	44	*10*	72	*18*	58	*22*	58	*13*
Dept. offers courses team-taught with education dept.		11	*3*	5	*3*	8	*3*	8	*2*

Table SP.4	% of TYCs	*SE*
Assign a mathematics faculty member to coordinate K–8 teacher education in mathematics	36	*5*
Offer a special mathematics course for preservice K–8 teachers in 2009–2010 or 2010–2011	7	*3*
Offer mathematics pedagogy courses in the mathematics department	5	*2*
Offer mathematics pedagogy courses outside of the mathematics department	9	*4*

Table SP.5	Percentage of departments with K-8 certification programs that require various numbers of mathematics courses for "early" certification							
Number of mathematics courses required for "early" grades certification	Univ (PhD) %	SE	Univ (MA) %	SE	College (BA) %	SE	All Math Depts %	SE
0 required	7	*3*	9	*8*	8	*5*	8	*4*
1 required	15	*4*	3	*3*	11	*5*	10	*3*
2 required	38	*6*	35	*13*	44	*8*	42	*6*
3 required	22	*4*	29	*9*	10	*4*	14	*3*
4 required	11	*3*	13	*8*	14	*4*	14	*3*
5 or more required	5	*2*	11	*4*	13	*4*	11	*3*
	Average number of various courses required for "early" certification							
Type of required courses	Univ (PhD) %	SE	Univ (MA) %	SE	College (BA) %	SE	All Math Depts %	SE
Mathematics Department math courses	2.4	*0.1*	3.0	*0.4*	2.7	*0.2*	2.7	*0.2*
Methods (pedagogy) courses (taught in any department)	1.7	*0.2*	1.8	*0.4*	1.3	*0.1*	1.4	*0.1*
Mathematics Department methods (pedogogy) courses	0.6	*0.1*	0.8	*0.2*	0.5	*0.1*	0.5	*0.1*

Table SP.6	Percentage of mathematics departments with K-8 certification program offering various courses							
Core areas covered by one or more specially designed courses(s) offered by mathematics departments	Univ (PhD)	SE	Univ (MA)	SE	Coll (MA)	SE	All Math	SE
Numbers/Operations	73	*5*	92	*5*	71	*5*	74	*4*
Algebra	58	*6*	64	*8*	55	*8*	57	*6*
Geometry/Measurement	67	*5*	94	*4*	64	*7*	69	*5*
Statistics/Probability	53	*6*	76	*5*	52	*8*	56	*6*
Methods of teaching elementary grades mathematics	27	*4*	36	7	31	7	31	*5*

Table SP.7	Percentages of mathematics faculty at mathematics departments with K-8 certification program							
Rank of faculty who generally teach courses of SP.6	Univ (PhD)	SE	Univ (MA)	SE	Coll (MA)	SE	All Math	SE
Tenured/tenure-track faculty	30	*5*	79	*7*	63	*6*	62	*5*
Postdocs	0	-	0	-	0	-	0	-
Other full-time faculty	53	*5*	10	*4*	25	*3*	26	*2*
Part-time faculty	8	*3*	11	*6*	12	*5*	11	*4*
Graduate teaching assistants	9	*3*	0	-	0	-	1	*0*

	Type of department							
Table SP.8	Univ (Ph.D)	*SE*	Univ (MA)	*SE*	Coll (BA)	*SE*	All math	*SE*
Percentage of departments at colleges and universities that have a separate education department	95	*2*	100	*0*	97	*1*	97	*1*
Of those with a separate education department, the percentage that offer courses team-taught by education and mathematics faculty	15	*3*	5	*4*	8	*3*	8	*3*

	Percentage of departments with secondary certification program where:											
Table SP.9 (SE's only)	Course is required				Course is generally taken, but not required				Math dept offers special course in the subject for secondary pre-service teachers			
Course	Univ (Ph.D) %	Univ (MA) %	Coll (BA) %	All math %	Univ (Ph.D) %	Univ (MA) %	Coll (BA) %	All math %	Univ (Ph.D) %	Univ (MA) %	Coll (BA) %	All math %
Adv. Calculus/Analysis	*5*	*6*	*7*	*5*	*4*	*3*	*6*	*5*	*4*	*3*	*2*	*1*
Modern Algebra	*4*	*4*	*3*	*2*	*3*	*3*	*3*	*2*	*4*	*2*	*4*	*3*
Number Theory	*4*	*9*	*7*	*5*	*4*	*11*	*5*	*4*	*5*	*-*	*2*	*2*
Geometry	*3*	*3*	*4*	*3*	*3*	*3*	*4*	*3*	*6*	*7*	*8*	*6*
Discrete Mathematics	*6*	*6*	*6*	*5*	*3*	*6*	*3*	*2*	*4*	*8*	*4*	*3*
Statistics	*4*	*3*	*3*	*2*	*4*	*3*	*3*	*2*	*3*	*7*	*4*	*3*
History of Math	*4*	*10*	*7*	*5*	*4*	*6*	*3*	*2*	*3*	*5*	*5*	*4*

Table SP.10 (SE's only)	Mathematics Depts Univ (PhD)	Univ (MA)	College (BA)	Total	Statistics Depts Univ (PhD)	Univ (MA)	Total	Two-Year Colleges
Percentage offering distance learning	4	9	5	4	4	10	4	4
Characterize majority of course instruction:								
All instruction with no instructor physically present	5	14	8	5	6	12	7	na
Some instruction with no instructor physically present	5	14	8	5	6	12	7	na
Format of majority of distance learning:								
Complete online	na	na	na	na	na	na	na	6
Hybrid	na	na	na	na	na	na	na	5
Other	na	na	na	na	na	na	na	3
Instructional materials created by:								
Faculty	6	9	13	8	8	13	7	2
Commercially produced materials	3	10	2	2	-	9	4	4
Combination of both	6	8	12	7	8	13	7	5
How distance learning students take majority of tests:								
Not at a monitored testing site	4	11	11	7	7	13	7	4
At proctored testing site	5	12	8	5	8	13	7	5
Combination of both	4	9	8	5	8	14	7	4
Give credit for distance learning not offered through department:								
Yes	5	9	11	7	7	12	6	na
No	5	9	7	5	8	13	7	na
No department policy	5	12	9	6	8	13	7	na

Table SP.11		
Distance learning course exams when there are multiple instructors teaching the course	% of TYCs	SE
No common departmental exams	39	6
Common departmental exams for some courses	20	4
Common departmental exams for all courses	23	4
Not applicable or unreported	18	na
Requirements of distance learning faculty whose entire teaching load is distance courses regarding time required to be on campus to meet with students		
Never	8	3
Only for scheduled meeting or student appointment	6	3
A specified number office hours per week	21	5
Not applicable or unreported	65	5

Table SP.12 (SE's only)	Math Univ (PhD)	Math Univ (MA)	Math College (BA)	Math Total	Stat Univ (PhD)	Stat Univ (MA)	Stat Total	TYC
Some courses in both non-distance and distance learning formats	3	5	6	4	0	0	0	2
Of those with courses in both formats, the percentage where:								
Contents, goals, and objectives same as in non-distance learning	2	0	1	1	4	0	2	4
Instructors hold comparable office hours on campus	5	12	14	8	8	12	7	na
Instructors participate in evaluation in same way	5	7	8	4	5	12	6	4
Same use of common exams as in face-to-face	6	12	8	6	8	13	7	5
Same course outlines as in face-to-face	2	0	2	1	4	9	5	2
Same course projects as in face-to-face	6	7	10	6	8	13	8	5

Table SP.13.A	Mathematics Departments Univ (PhD)	SE	Univ (MA)	SE	College (BA)	SE	Total	SE
E22. Introduction to Proofs	1	*0*	4	*3*	1	*0*	1	*0*
E23-1. Modern Algebra I	1	*1*	1	*1*	0	*0*	1	*0*
E23-2. Modern Algebra II								
E24. Number Theory	1	*0*					0	*0*
E25. Combinatorics								
E26. Actuarial Mathematics								
E27. Logic/Foundations (not E22)								
E28. Discrete Structures					0	*0*	0	*0*
E29. History of Mathematics	3	*1*	5	*4*	1	*1*	2	*1*
E30. Geometry	2	*1*			0	*0*	0	*0*
E31-1. Advanced Calculus I and/or Real Analysis I	1	*0*	4	*3*			1	*0*
E31-2. Advanced Calculus II and/or Real Analysis II								
E32. Advanced Mathematics for Engineering and Physical Sciences	1	*1*					0	*0*
E33. Advanced Linear Algebra (beyond E17, E19)	1	*1*					0	*0*
E34. Vector Analysis								
E35. Advanced Differential Equations (beyond E18)								
E36. Partial Differential Equations								
E37. Numerical Analysis I and II	1	*1*					0	*0*
E38. Applied Mathematics (Modeling)								
E39. Complex Variables	1	*0*					0	*0*
E40. Topology								
E41. Mathematics of Finance (not E26, E38)	1	*0*					0	*0*
E42. Codes and Cryptology								
E43. Biomathematics					1	*1*	1	*1*
E44. Operations Research (all courses)								
E45. Senior Seminar/ Independent Study in Mathematics								
E46. Other advanced level mathematics								
E47. Mathematics for Secondary School Teachers	2	*1*	4	*3*			1	*0*

Table SP.13.B (SE's only)	Mathematics Departments Univ (PhD)	Univ (MA)	College (BA)	Total	Statistics Departments Univ (PhD)	Univ (MA)	Total
E6. Mathematical Statistics (calculus prerequisite)							
E7. Probability (calculus prerequisite)	*1*			*0*	*0*		*0*
E8. Combined Probability & Statistics (calculus prerequisite)	*1*			*0*			
E9. Stochastic Processes							
E10. Applied Statistical Analysis	*1*	*3*		*0*	*2*		*1*
E11. Design & Analysis of Experiments					*1*		*1*
E12. Regression (and Correlation)	*1*		*1*	*1*	*1*		*1*
E13. Biostatistics					*1*		*1*
E14. Nonparametric Statistics					*1*		*1*
E15. Categorical Data Analysis							
E16. Sample Survey Design & Analysis							
E17. Statistical Computing							
E18. Data Management							
E19. Senior Seminar/ Independent Studies							
E20. Bayesian Statistics							
E21. Statistical Consulting							
E22. Statistical Software					*0*		*0*
E23. Other upper level Probability & Statistics	*1*			*0*			
E23. Other mathematical science courses					*1*	*5*	*2*
F16. Statistical Computing (Math only)							

Table SP.14	Honors	Club	Women	Minorities	Contests	Colloquia	Outreach
Univ (PhD)	70	91	31	21	93	82	71
SE	*5*	*2*	*3*	*4*	*2*	*3*	*4*
Univ (MA)	40	96	21	21	82	88	75
SE	*8*	*3*	*7*	*7*	*5*	*5*	*5*
Coll (BA)	15	75	16	12	62	51	40
SE	*4*	*5*	*5*	*3*	*4*	*6*	*6*
All Math	26	80	19	14	69	60	49
SE	*3*	*4*	*4*	*2*	*3*	*4*	*5*
Univ (PhD)	43	48	19	22	24	67	30
SE	*4*	*5*	*4*	*4*	*4*	*4*	*4*
Univ (MA)	55	45	0	0	36	82	18
SE	*11*	*11*			*11*	*8*	*8*
All Stat	46	47	13	15	28	71	27
SE	*4*	*5*	*3*	*3*	*4*	*4*	*4*
TYC	20	31	6	11	41	16	32
SE	*3*	*5*	*2*	*3*	*4*	*4*	*5*

Table SP.15	REU	Ind. Studies	Advisor	Thesis	Career	Grad. Sch.	Intern	Sen Sem	Consult. Lab
Univ (PhD)	96	96	90	63	40	67	50	47	
SE	*1*	*2*	*3*	*4*	*3*	*4*	*4*	*5*	
Univ (MA)	91	100	100	56	46	70	67	66	
SE	*6*	*0*	*0*	*10*	*6*	*4*	*8*	*11*	
Coll (BA)	83	94	90	58	17	46	55	59	
SE	*4*	*2*	*5*	*8*	*4*	*7*	*6*	*7*	
All Math	86	95	91	59	24	52	56	58	
SE	*3*	*1*	*3*	*6*	*3*	*6*	*4*	*5*	
Univ (PhD)	85	90	89	54	30	66	69	30	32
SE	*3*	*2*	*3*	*4*	*4*	*4*	*4*	*4*	*4*
Univ (MA)	82	100	73	27	45	64	91	27	55
SE	*8*	*0*	*10*	*10*	*11*	*11*	*6*	*10*	*11*
All Stat	84	93	84	46	35	66	75	29	39
SE	*3*	*2*	*3*	*4*	*4*	*4*	*3*	*4*	*4*
TYC	14	36	42	na	na	na	na	na	na
SE	*4*	*5*	*5*						

Table SP.16	Mathematics Departments				Statistics Departments		
Numbers of team-taught courses	Univ (PhD) %	Univ (MA) %	College (BA) %	Total %	Univ (PhD) %	Univ (MA) %	Total %
None	73	70	89	84	78	100	84
SE	*4*	*7*	*4*	*3*	*4*	*0*	*3*
One course	15	30	7	12	14	0	10
SE	*4*	*7*	*3*	*2*	*3*		*2*
Two or more courses	12	0	3	4	8	0	6
SE	*2*		*2*	*2*	*3*		*2*

Table SP.17	Univ (Phd)		Univ (MA)		Coll (BA)		All departments	
Percentage that offered any new interdisciplinary course	56		45		30		36	
SE	*6*		*8*		*5*		*4*	
Of those offering any new course, those offering course in:	Offered new course %	Mean number of new courses	Offered new course %	Mean number of new courses	Offered new course %	Mean number of new courses	Offered new course %	Mean number of new courses
Mathematics and finance or business	24	1.5	20	1.1	1	2.0	8	1.4
SE	*4*	*0.1*	*8*	*0.1*	*1*	*1.1*	*1*	*0.1*
Mathematics and biology	41	1.5	20	1.0	3	1.2	12	1.3
SE	*5*	*0.1*	*8*	*0.0*	*1*	*0.2*	*2*	*0.1*
Mathematics and the study of the environment	3	1.0	12	1.0	5	1.0	5	1.0
SE	*1*	*0.0*	*5*	*0.0*	*3*	*0.0*	*2*	*0.0*
Mathematics and engineering or the physical sciences	13	1.8	9	1.0	4	1.0	6	1.3
SE	*5*	*0.4*	*5*	*0.0*	*2*	*0.0*	*2*	*0.1*
Mathematics and economics	4	1.0	5	1.0	3	1.1	4	1.1
SE	*2*	*0.0*	*5*	.	*3*	*0.7*	*2*	*0.1*
Mathematics and social sciences other than economics	1	1.0	5	1.0	0	0	1	1.0
SE	*1*	.	*4*	*0.0*			*1*	*0.0*
Mathematics and education	18	2.0	14	1.4	13	1.6	14	1.7
SE	*3*	*0.4*	*5*	*0.3*	*5*	*0.3*	*3*	*0.2*
Mathematics and the humanities	5	1.0	13	1.0	13	1.4	12	1.3
SE	*2*	*0.0*	*4*	*0.0*	*4*	*0.3*	*3*	*0.3*
Other	2	1.0	0	0	10	1.3	8	1.2
SE	*1*	*0.0*			*4*	*0.2*	*3*	*0.2*

Table SP.18 (SE's only)	Four-year Mathematics			Two-year Mathematics			Four-year Statistics		
Percentage of departments with dual enrollment courses	2			5			2		
Number of dual enrollments in:	Dual Enrollments		Other enrollments	Dual enrollments		Other enrollments	Dual enrollments		Other enrollments
	spring 2010	fall 2010	fall 2010	spring 2010	fall 2010	fall 2010	spring 2010	fall 2010	fall 2010
College algebra	1887	6004	15896	4967	7660	27830			
Precalculus	2469	1322	8188	5340	7508	7334			
Calculus I	1771	945	15230	2178	2678	5972			
Statistics	1600	1069	15835	1919	1226	12162	778	0	5069
Other	853	779		3987	5233				
Dept. control of dual enroll. courses taught by HS teachers	Never	Sometimes	Always	Never	Sometimes	Always	Never	Sometimes	Always
Textbook choice	7	14	14	6	5	6	28	22	22
Syllabus design/ approval	1	1	2	3	1	3	28	28	
Final exam design	8	13	14	10	7	7	28	28	
Choice of instructor	10	10	17	9	6	8	28	22	22
Departmental teaching evaluations required in dual enrollment courses			19			6			

Table S.19	Asian	Black	Hisp.	White	Other
FT men %	9	2	2	56	2
SE	*0*	*0*	*0*	*1*	*0*
FT women %	3	1	1	23	1
SE	*0*	*0*	*0*	*1*	*0*

Table S.20	Asian	Black	Hisp.	White	Other
FT men %	20	1	1	49	3
SE	*1*	*0*	*0*	*1*	*0*
FT women %	8	0	1	15	2
SE	*1*	*0*	*0*	*1*	*0*

Table SP.20 (SE's only)	Required in all majors			Required in some but not all majors			Not required in any major		
Mathematics Department Requirements	Univ (PhD) %	Univ (MA) %	College (BA) %	Univ (PhD) %	Univ (MA) %	College (BA) %	Univ (PhD) %	Univ (MA) %	College (BA) %
Modern Algebra I	5	12	6	5	13	7	5	4	4
Real Analysis I	4	10	8	3	10	4	3	7	7
Modern Algebra I or Real Analysis I	4	6	3	4	6	5	4	8	5
A one-year upper level sequence	4	7	6	3	4	6	5	10	6
At least one computer science course	4	11	6	3	10	4	3	6	4
At least one statistics course	4	9	5	4	5	6	3	7	5
At least one applied mathematics course beyond course E21	4	8	7	4	5	3	4	7	8
A capstone experience (senior project, thesis, seminar, internship)	5	9	6	3	5	4	5	12	5
An exit exam (written or oral)	3	4	4	1	3	3	3	4	3

Table SP.21 (SE's only)	Required in all majors		Required in some but not all majors		Not required in any major	
Percentage of statistics departments that require:	Univ (PhD) %	Univ (MA) %	Univ (PhD) %	Univ (MA) %	Univ (PhD) %	Univ (MA) %
(a) Calculus I	2	6	2	6	0	na
(b) Calculus II	2	6	2	6	0	na
(c) Multivariable Calculus	5	11	4	10	3	8
(d) Linear algebra/Matrix theory	4	11	3	10	2	6
(e) At least one Computer Science course	5	6	4	na	4	6
(f) At least one applied mathematics course, not incl. (a), (b), (c), (d)	4	11	4	8	5	8
(g) A capstone experience (e.g., a senior thesis or project, seminar, or internship)	5	11	3	6	5	11
(h) An exit exam (oral or written)	3	8	2	na	3	8
(i) One Probability Course	4	6	3	6	2	na
(j) One Mathematical Statistics Course	4	11	3	11	2	na
(k) One Linear Models Course	5	11	3	8	4	10
(l) One Bayesian Inference Course	2	na	3	na	4	0

Table SP.22	Mathematics Departments			
Number of tracks	Univ (PhD) %	Univ (MA) %	College (BA) %	Total %
One or two tracks	26	34	72	60
SE	*4*	*4*	*6*	*4*
Three or four tracks	37	46	21	27
SE	*4*	*8*	*5*	*4*
More than four tracks	37	17	5	11
SE	*5*	*7*	*2*	*2*

Table SP.23	Academic Years 2009-2010 & 2010-2011							
Upper-level mathematics courses	All Math Depts %	*SE*	Univ (PhD) %	*SE*	Univ (MA) %	*SE*	College (BA) %	*SE*
Modern Algebra I	80	*3*	85	*4*	96	*3*	76	*5*
Modern Algebra II	27	*3*	59	*4*	49	*9*	16	*3*
Number Theory	51	*4*	72	*3*	61	*7*	45	*6*
Combinatorics	27	*3*	61	*4*	53	*8*	15	*4*
Actuarial Mathematics	13	*2*	22	*2*	23	*5*	10	*3*
Foundations/Logic	11	*2*	23	*3*	13	*5*	8	*3*
Discrete Structures	30	*3*	26	*4*	37	*8*	30	*4*
History of Mathematics	49	*4*	52	*2*	69	*7*	45	*5*
Geometry	74	*3*	83	*2*	78	*6*	71	*4*
Math for secondary teachers	35	*6*	35	*3*	62	*6*	30	*8*
Adv Calculus/ Real Analysis I	79	*4*	94	*3*	86	*3*	75	*5*
Adv Calculus/Real Analysis II	31	*4*	71	*4*	50	*7*	20	*6*
Adv Mathematics for Engineering/Physics	12	*2*	41	*3*	19	*7*	5	*2*
Advanced Linear Algebra	23	*3*	61	*7*	48	*6*	11	*3*
Introduction to Proofs	57	*5*	73	*5*	77	*7*	50	*7*

Table SP.23 (continued)	Academic Years 2009-2010 & 2010-2011							
Upper-level mathematics courses	All Math Depts %	*SE*	Univ (PhD) %	*SE*	Univ (MA) %	*SE*	College (BA) %	*SE*
Vector Analysis	11	*2*	26	*4*	15	*6*	7	*2*
Advanced Differential Equations	16	*3*	48	*4*	24	*6*	8	*3*
Partial Differential Equations	26	*2*	74	*4*	56	*9*	11	*3*
Numerical Analysis I and II	42	*4*	84	*4*	63	*5*	31	*5*
Applied Math/Modeling	37	*4*	60	*4*	41	*7*	33	*5*
Complex Variables	44	*4*	80	*4*	65	*8*	33	*5*
Topology	25	*3*	65	*3*	40	*8*	15	*3*
Mathematics of Finance	12	*2*	29	*4*	16	*5*	7	*2*
Codes & Cryptology	11	*2*	22	*3*	11	*3*	9	*2*
Biomathematics	12	*2*	36	*4*	21	*6*	5	*2*
Operations Research	17	*2*	31	*4*	27	*6*	13	*3*
Math senior seminar/Ind study	65	*3*	67	*5*	85	*5*	61	*4*
All other advanced level mathematics	25	*5*	46	*4*	43	*10*	17	*6*

Table SP.24 (SE's only)	AY 2009-10 & 2010-11				AY 2009-10 & 2010-2011		
Upper level statistics courses	All Math Depts %	PhD Math %	MA Math %	BA Math %	All Stat Depts %	PhD Stat %	MA Stat %
Mathematical Statistics	4	4	8	6	4	3	10
Probability	4	5	9	6	4	4	9
Combined Probability and Statistics	3	2	8	4	4	4	10
Stochastic Processes	1	3	3	2	4	4	9
Applied Statistical Analysis	2	4	5	3	4	4	10
Experimental Design	2	3	7	2	4	4	10
Regression & Correlation	2	4	7	2	4	4	7
Biostatistics	2	3	5	2	4	4	10
Nonparametric Statistics	1	2	4	1	4	4	10
Categorical Data Analysis	0	1	1	0	4	4	10
Sample Survey Design	0	1	2	0	4	4	10
Stat Software & Computing	1	3	6	1			
Stat Computing					4	4	10
Stat Software					4	4	14
Data Management	1	1	na	1	3	2	8
Bayesian Statistics					5	4	13
Statistical Consulting					5	4	13
Senior Seminar/ Independent Study	3	2	6	5	4	4	10

Table SP.25	Mathematics Departments			Statistics Departments	
Departmental estimates of post-college plans	Univ (PhD) %	Univ (MA) %	College (BA) %	Univ (PhD) %	Univ (MA) %
Students who went into pre-college teaching	13	48	27	1	1
SE	*1*	*9*	*3*	*1*	*1*
Students who went to graduate school in the mathematical or statistical sciences	15	12	17	23	29
SE	*1*	*3*	*3*	*2*	*5*
Students who went to graduate or professional school outside of mathematics/statistics	10	4	8	5	5
SE	*1*	*1*	*2*	*1*	*3*
Students who took jobs in business, government, etc.	27	19	30	41	45
SE	*2*	*4*	*3*	*4*	*5*
Students who had other plans known to the department	5	3	4	2	3
SE	*1*	*1*	*2*	*1*	*2*
Students whose plans are not known to the department	30	14	13	29	18
SE	*3*	*2*	*2*	*5*	*5*

Table SP.26	Four-year Mathematics Departments			Statistics Departments	
Percentage using various assessment tools	Univ (PhD) %	Univ (MA) %	College (BA) %	Univ (PhD) %	Univ (MA) %
Consult outside reviewers	53	48	31	42	80
SE	*4*	*8*	*5*	*5*	*9*
Survey program graduates	71	80	71	63	70
SE	*4*	*8*	*4*	*4*	*11*
Consult other departments	54	45	26	47	60
SE	*4*	*12*	*6*	*5*	*11*
Study data on students' progress in later courses	62	65	55	41	40
SE	*5*	*7*	*6*	*5*	*11*
Evaluate placement system	72	51	60	12	30
SE	*2*	*9*	*6*	*3*	*11*
Change undergraduate program due to assessment	78	76	69	61	80
SE	*5*	*12*	*6*	*4*	*9*

Table E.1 (SE's only)	Mathematics Departments				Statistics Departments		
Bachelors degrees in Math and Stat Depts	Univ (PhD)	Univ (MA)	College (BA)	Total Math	Univ (PhD)	Univ (MA)	Total Stat
Mathematics majors							
Men	268	113	384	482			
Women	228	195	531	609			
Total Math degrees	471	287	871	1031			
Mathematics Education							
Men	32	106	119	163			
Women	56	246	179	309			
Total Math Ed degrees	86	336	258	433			
Statistics Majors							
Men	26	11	22	36	32	45	55
Women	23	16	12	30	19	27	33
Total Stat degrees	48	26	28	61	50	66	83
Computer Science majors							
Men	117	48	307	332			
Women	16	14	77	80			
Total CS degrees	127	59	363	389			
Total degrees - Men	264	170	527	614	32	45	55
Total degrees - Women	230	396	513	688	19	27	33
Total all degrees	462	550	936	1180	50	66	83

	Fall 2010 enrollments (1000s)						
Table E.2 (SE's only)	Mathematics Departments				Statistics Departments		
	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts
Mathematics Courses							
Precollege	9	14	15	22			
Introductory (incl. Precalc)	17	21	22	35			
Calculus	13	19	26	35			
Advanced Mathematics	3	4	5	7			
Total Math courses	26	46	49	73			
Statistics Courses							
Elementary Statistics	7	4	14	16	3	5	6
Upper Statistics	1	1	2	3	1	5	5
Total Stat Courses	7	5	14	16	4	6	7
CS courses							
Lower CS	1	1	9	9			
Middle CS	0	1	2	2			
Upper CS	0	1	2	2			
Total CS courses	2	2	11	11			
Total all courses	30	49	58	82			

Table E.3 (SE's only)	Number of sections: Fall 2010						
	Mathematics Departments				Statistics Departments		
	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts
Mathematics Courses							
Precollege	284	537	583	841			
Introductory (incl. Precalc)	517	701	668	1098			
Calculus	279	512	791	982			
Advanced Mathematics	101	1043	240	1075			
Total Math courses	719	1821	1333	2369			
Statistics Courses							
Elementary Statistics	123	98	393	423	70	123	141
Upper Statistics	36	110	125	170	33	153	157
Total Stat Courses	137	187	403	465	86	205	223
CS courses							
Lower CS	35	46	340	345			
Middle CS	19	34	116	122			
Upper CS	25	24	158	162			
Total CS courses	76	98	533	547			
Total all courses	825	1910	1481	2554			

Table E.4	Four-year Mathematics Departments		Two-year Mathematics Departments		Statistics Departments	
	Distance-learning Enrollments	Other Enrollments	Distance-learning Enrollments	Other Enrollments	Distance-learning Enrollments	Other Enrollments
Precollege Level	8106	201089	87073	1062667		
SE	*2256*	*21544*	*22398*	*81875*		
College Algebra, Trigonometry, & Pre-Calculus	12021	431420	40898	309272		
SE	*1959*	*22913*	*10166*	*27694*		
Calculus I	2159	332632	3504	82192		
SE	*976*	*14965*	*917*	*5577*		
Calculus II	782	128104	285	30827		
SE	*362*	*13668*	*160*	*2571*		
Differential Equations & Linear Algebra	862	115837	298	10473		
SE	*314*	*9536*	*209*	*1401*		
Elementary Statistics	12368	218385	23363	110910	4171	77153
SE	*2477*	*15877*	*4494*	*9371*	*1774*	*4741*

Table E.5	Percentage of mathematics sections taught by						Percentage of statistics sections taught by						Percentage of CS sections taught by					
	TTE %	OFT %	PT %	GTA %	Ukn %	No. of Math sections	TTE [1] %	OFT %	PT %	GTA %	Ukn %	No. of Stat sections	TTE %	OFT %	PT %	GTA %	Ukn %	No. of CS sections
Math Depts																		
Univ (PhD)	33	24	14	17	13	19088	51	14	7	16	12	1530	42	30	15	11	2	201
SE	*1*	*1*	*1*	*1*	*1*	*719*	*3*	*2*	*1*	*2*	*2*	*137*	*10*	*8*	*6*	*4*	*1*	*76*
Univ (MA)	46	17	21`	6	11	16494	63	10	16	1	10	1628	89	0	11	0	0	307
SE	*4*	*4*	*5*	*1*	*7*	*1821*	*4*	*3*	*3*	*1*	*5*	*187*	*9*	*0*	*9*	*0*	*0*	*98*
Coll (BA)	57	11	23	0	10	29712	62	8	15	0	14	5943	58	18	22	0	2	3740
SE	*3*	*2*	*2*	*0*	*2*	*1333*	*3*	*1*	*3*	*0*	*3*	*403*	*5*	*5*	*6*	*0*	*1*	*533*
Total Math Depts	47	16	20	6	11	65294	60	9	14	3	13	9102	60	17	21	1	2	4248
SE	*2*	*1*	*2*	*0*	*2*	*2369*	*2*	*1*	*2*	*1*	*2*	*465*	*5*	*5*	*6*	*0*	*1*	*547*
Stat Depts																		
Univ (PhD)							38	13	7	15	27	1573						
SE							*2*	*1*	*1*	*2*	*2*	*86*						
Univ (MA)							65	9	10	2	14	1085						
SE							*5*	*2*	*2*	*1*	*5*	*205*						
Total Stat Depts							49	11	8	10	22	2658						
SE							*3*	*1*	*1*	*1*	*2*	*223*						

Table E.6	Number of precollege-level sections taught by TTE	OFT	PT	GTA	Ukn	Total Sections
Mathematics Departments						
Univ (PhD)	31	353	666	365	162	1578
SE	*11*	*98*	*164*	*52*	*25*	*284*
Univ (MA)	279	620	769	279	128	2075
SE	*67*	*350*	*268*	*111*	*42*	*537*
Coll (BA)	1043	461	1806	27	362	3699
SE	*291*	*145*	*271*	*26*	*119*	*583*
Total	1353	1434	3241	671	652	7352
SE	*298*	*391*	*415*	*125*	*129*	*841*

Table E.7	Number of introductory-level sections taught by TTE	OFT	PT	GTA	Ukn	Total Sections
Mathematics Departments						
Univ (PhD)	636	2128	1123	1616	766	6268
SE	*63*	*244*	*124*	*205*	*127*	*517*
Univ (MA)	2073	1611	2058	485	329	6556
SE	*315*	*267*	*590*	*139*	*156*	*701*
Coll (BA)	5529	1891	3761	0	1344	12525
SE	*519*	*333*	*280*	*0*	*227*	*668*
Total	8238	5631	6942	2100	2438	25349
SE	*611*	*492*	*665*	*248*	*303*	*1098*

Table E.8	Number of calculus-level sections taught by TTE	OFT	PT	GTA	Ukn	Total Sections
Mathematics Departments						
Univ (PhD)	3120	2057	789	1289	721	7976
SE	*173*	*160*	*111*	*124*	*111*	*279*
Univ (MA)	3080	495	611	160	213	4559
SE	*329*	*83*	*127*	*83*	*75*	*512*
Coll (BA)	6743	839	1223	0	771	9575
SE	*551*	*198*	*567*	*0*	*411*	*791*
Total	12943	3391	2622	1448	1705	22110
SE	*665*	*268*	*591*	*149*	*433*	*982*

Table E.9	Number of elementary-level statistics sections taught by TTE	OFT	PT	GTA	Ukn	Total Sections
Mathematics Departments						
Univ (PhD)	251	243	124	274	77	969
SE	*31*	*45*	*23*	*56*	*22*	*123*
Univ (MA)	641	185	293	19	70	1208
SE	*82*	*44*	*59*	*11*	*29*	*98*
Coll (BA)	2564	601	1130	28	691	5014
SE	*134*	*104*	*234*	*22*	*187*	*393*
Total	3456	1029	1547	320	838	7191
SE	*161*	*121*	*243*	*61*	*190*	*423*

Table E.10	Number of lower-level CS sections taught by TTE	OFT	PT	GTA	Ukn	Total Sections
Mathematics Departments						
Univ (PhD)	25	29	29	15	4	101
SE	*7*	*13*	*13*	*8*	*3*	*35*
Univ (MA)	116	0	30	0	0	146
SE	*31*	*0*	*22*	*0*	*0*	*46*
Coll (BA)	1089	397	656	14	73	2230
SE	*156*	*136*	*232*	*14*	*38*	*340*
Total	1229	426	715	30	77	2477
SE	*160*	*136*	*234*	*16*	*38*	*345*

Table E.11	Number of middle-level CS sections taught by TTE	OFT	PT	GTA	Ukn	Total Sections
Mathematics Departments						
Univ (PhD)	31	11	2	7	0	51
SE	*10*	*7*	*2*	*6*	*0*	*19*
Univ (MA)	92	0	0	0	0	92
SE	*34*	*0*	*0*	*0*	*0*	*34*
Coll (BA)	521	156	95	0	0	769
SE	*98*	*51*	*47*	*0*	*0*	*116*
Total	644	168	97	7	0	912
SE	*104*	*51*	*47*	*6*	*0*	*122*

Table E.12

Mathematics Departments	Sections taught by TTE	Total sections	Statistics Departments	Sections taught by TTE	Total sections
Advanced Math. courses					
Univ (PhD)	2500	3266			
SE	*96*	*101*			
Univ (MA)	2098	3304			
SE	*180*	*1043*			
Coll (BA)	3548	3913			
SE	*257*	*240*			
Total advanced mathematics	8146	10483			
SE	*328*	*1075*			
Advanced Stat. courses			Advanced Stat. courses		
Univ (PhD)	438	561	Univ (PhD)	324	452
SE	*24*	*36*		*22*	*33*
Univ (MA)	308	420	Univ (MA)	382	442
SE	*63*	*110*		*131*	*153*
Coll (BA)	721	929			
SE	*107*	*125*			
Total advanced statistics	1467	1910	Total advanced stat.	706	894
SE	*126*	*170*		*133*	*157*
Total all advanced courses	9613	12394			
SE	*360*	*1067*			

Table E.13	Average section size Fall 2010							
	Mathematics Depts				Statistics Depts			All Depts.
	Univ (PhD)	Univ (MA)	Coll (BA)	Overall Math	Univ (PhD)	Univ (MA)	Overall Stat	2010
Mathematics courses								
Precollege	36	30	23	27				
SE	*3*	*4*	*1*	*1*				
Introductory (incl. Precalc)	47	31	27	33				
SE	*2*	*1*	*1*	*1*				
Calculus	48	31	24	34				
SE	*2*	*1*	*2*	*1*				
Advanced Mathematics	20	12	12	14				
SE	*1*	*5*	*1*	*2*				
Statistics courses								
Elementary Statistics	52	32	26	30	49	38	45	33
SE	*5*	*3*	*1*	*1*	*3*	*3*	*2*	nr
Upper Statistics	27	13	12	17	33	27	30	21
SE	*2*	*4*	*2*	*1*	*1*	*2*	*1*	nr
CS courses								
Lower CS	29	22	20	21				
SE	*4*	*2*	*2*	*2*				
Middle CS	18	15	12	12				
SE	*5*	*2*	*1*	*1*				
Upper CS	15	16	11	11				
SE	*1*	*7*	*2*	*2*				

Table E.14	Average recitation section size		
For Lecture/Recitation Courses	Univ (PhD)	Univ (MA)	College (BA)
Calculus Courses			
Mainstream Calculus I	29	30	30
SE	*1*	*2*	*4*
Mainstream Calculus II	29	25	33
SE	*1*	*4*	*7*
Other Calculus I	30	19	15
SE	*1*	*10*	*7*
Elementary Statistics			
in Mathematics Depts	28	29	32
SE	*3*	*3*	*3*
in Statistics Depts	30	34	
SE	*2*	*3*	

Table E.15	Mathematics Departments				Statistics Departments		
Enrollments	Univ (PhD)	Univ (MA)	College (BA)	Total	Univ (PhD)	Univ (MA)	Total
Total freshmen enrolled in Fall 2010	346	209	336	891	65	57	122
SE	*18*	*36*	*37*	*55*	*9*	*12*	*15*
Total entering with AP credit	34	8	13	55	11	2	13
SE	*3*	*4*	*4*	*6*	*4*	*1*	*4*
Mean ratio of those with AP credit to total enrollment	0.13	0.03	0.04	0.05	0.18	0.04	0.12
SE	*0.01*	*0.01*	*0.01*	*0.01*	*0.05*	*0.01*	*0.03*

Table F.1	T	TE	OFT	PD	PT	T	TE	OFT	PD	PT	T	TE	OFT	PD	PT
Mathematics	PhD Depts					MA Depts					BA Depts				
Doc Fac	4604	986	1739	1001	370	2369	758	237	16	354	5218	1712	627	6	609
SE	*25*	*8*	*25*	*22*	*7*	*34*	*21*	*12*	*4*	*28*	*292*	*136*	*133*	*4*	*107*
Doc (F)	518	269	496	226	107	579	273	89	6	102	1408	546	158	0	220
SE	*4*	*3*	*8*	*6*	*3*	*14*	*10*	*7*	*3*	*10*	*114*	*61*	*55*	*0*	*49*
Non-doc Fac	16	8	756	0	731	65	17	749	1	1434	475	136	1821	0	2553
SE	*1*	*1*	*13*	*0*	*14*	*6*	*3*	*28*	*1*	*78*	*74*	*50*	*279*	*0*	*256*
Non-doc (F)	6	1	449	0	326	26	11	427	1	659	203	127	828	0	1263
SE	*0*	*0*	*8*	*0*	*7*	*3*	*3*	*18*	*1*	*36*	*41*	*49*	*105*	*0*	*154*
Tot Math	4621	994	2495	1001	1101	2434	775	986	18	1787	5693	1848	2448	6	3161
SE	*25*	*8*	*28*	*22*	*17*	*35*	*21*	*32*	*4*	*89*	*312*	*139*	*377*	*4*	*292*
Tot Math (F)	525	270	946	226	433	605	284	516	7	761	1611	673	987	0	1484
SE	*4*	*3*	*12*	*6*	*8*	*14*	*9*	*19*	*3*	*38*	*130*	*76*	*124*	*0*	*160*
Stat Depts	PhD Depts					MA Depts									
Doc Fac	579	207	184	71	84	145	57	20	15	9					
SE	*12*	*6*	*8*	*6*	*8*	*11*	*9*	*7*	*8*	*6*					
Doc (F)	95	84	61	18	15	20	18	7	7	0					
SE	*3*	*3*	*3*	*2*	*1*	*4*	*5*	*5*	*5*	*0*					
Non-doc Fac	1	2	31	0	21	2	0	37	0	20					
SE	*0*	*1*	*3*	*0*	*2*	*2*	*0*	*8*	*0*	*8*					
Non-doc (F)	0	0	20	0	11	2	0	20	0	7					
SE	*0*	*0*	*1*	*0*	*1*	*2*	*0*	*6*	*0*	*3*					
Tot Stat	580	209	215	71	105	147	57	57	15	29					
SE	*12*	*6*	*9*	*6*	*8*	*12*	*9*	*10*	*8*	*12*					
Tot Stat (F)	95	84	82	18	26	22	18	26	7	7					
SE	*3*	*3*	*4*	*2*	*2*	*3*	*5*	*8*	*5*	*3*					

Standard Error Table for F.1.1

Table F.1.1	T	TE	OFT	PD	PT
Mathematics	PhD Depts + MA Depts + BA Depts				
Doc Fac	12191	3456	2603	1024	1332
SE	*295*	*137*	*136*	*23*	*111*
Doc (F)	2505	1088	744	232	429
SE	*115*	*62*	*56*	*6*	*50*
Non-doc Fac	557	161	3326	1	4718
SE	*74*	*50*	*280*	*1*	*268*
Non-doc (F)	235	139	1705	1	2249
SE	*41*	*49*	*107*	*1*	*158*
Tot Math	12747	3617	5929	1025	6050
SE	*315*	*141*	*380*	*23*	*306*
Tot Math (F)	2740	1227	2449	233	2678
SE	*131*	*77*	*126*	*6*	*164*
Stat Depts					
Doc Fac	724	264	204	86	93
SE	*16*	*11*	*11*	*10*	*10*
Doc (F)	115	102	68	24	15
SE	*5*	*6*	*6*	*5*	*1*
Non-doc Fac	3	2	69	0	41
SE	*2*	*1*	*9*	*0*	*8*
Non-doc (F)	2	0	40	0	18
SE	*2*	*0*	*6*	*0*	*4*
Tot Stat	727	267	272	86	133
SE	*17*	*11*	*13*	*10*	*15*
Tot Stat (F)	117	102	108	24	32
SE	*5*	*6*	*9*	*5*	*4*

	Univ (PhD)				Univ (MA)				Coll (BA)				Total			
Table F.2	T	TE	OFT	PD	T	TE	OFT	PD	T	TE	OFT	PD	T	TE	OFT	PD
Men, 2010	4096	724	1549	775	1829	490	470	10	4082	1175	1461	6	10007	2390	3480	792
SE	*24*	*6*	*20*	*18*	*29*	*18*	*19*	*2*	*233*	*114*	*284*	*4*	*236*	*115*	*285*	*18*
Women, 2010	525	270	946	226	605	284	516	7	1611	673	987	0	2740	1227	2449	233
SE	*4*	*3*	*12*	*6*	*14*	*9*	*19*	*3*	*130*	*76*	*124*	*0*	*131*	*77*	*126*	*6*
Total, 2010	4621	994	2495	1001	2434	775	986	18	5693	1848	2448	6	12747	3617	5929	1025
SE	*25*	*8*	*28*	*22*	*35*	*21*	*32*	*4*	*312*	*139*	*377*	*4*	*315*	*141*	*380*	*23*

	Univ (PhD)				Univ (MA)				Total			
Table F.3	T	TE	OFT	PD	T	TE	OFT	PD	T	TE	OFT	PD
Men, 2010	485	125	133	53	125	40	31	9	610	165	164	62
SE	*10*	*4*	*6*	*4*	*13*	*7*	*7*	*6*	*16*	*8*	*10*	*8*
Women, 2010	95	84	82	18	22	18	26	7	117	102	108	24
SE	*3*	*3*	*4*	*2*	*3*	*5*	*8*	*5*	*5*	*6*	*9*	*5*
Total, 2010	580	209	215	71	147	57	57	15	727	267	272	86
SE	*12*	*6*	*9*	*6*	*12*	*9*	*10*	*8*	*17*	*11*	*13*	*10*

Standard Error Tables for F.4

Table F.4	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69
Total Univ (PhD)	1	8	12	12	12	13	14	12	9	7
SE	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Univ (MA)	2	9	12	14	14	14	14	10	7	4
SE	*0*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*0*
Total Coll (BA)	4	10	11	12	16	13	11	13	8	2
SE	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*0*

Standard Error Tables for F.5 (Full-time) and F.6 (Part-time)

Table F.5	Asian	Black	Mex Am	White	Oth/Unk
PhD Math					
FT Men	13	1	2	59	3
SE	*0*	*0*	*0*	*0*	*0*
FT Women	4	0	1	16	1
SE	*0*	*0*	*0*	*0*	*0*
MA Math					
FT Men	12	4	2	47	2
SE	*1*	*0*	*0*	*1*	*0*
FT Women	5	2	1	26	1
SE	*0*	*0*	*0*	*1*	*0*
BA Math					
FT Men	4	2	2	57	2
SE	*1*	*0*	*0*	*2*	*0*
FT Women	2	1	1	28	1
SE	*0*	*0*	*0*	*1*	*0*
All Stat					
FT Men	20	1	1	49	3
SE	*1*	*0*	*0*	*1*	*0*
FT Women	8	0	1	15	2
SE	*1*	*0*	*0*	*1*	*0*

Table F.6	Asian	Black	Mex Am	White	Oth/Unk
PhD Math					
PT Men	5	2	1	47	6
SE	*0*	*0*	*0*	*1*	*0*
PT Women	4	1	1	30	3
SE	*0*	*0*	*0*	*1*	*0*
MA Math					
PT Men	3	4	2	40	9
SE	*0*	*1*	*0*	*1*	*1*
PT Women	3	3	2	29	6
SE	*0*	*0*	*0*	*1*	*0*
BA Math					
PT Men	2	1	0	43	8
SE	*0*	*0*	*0*	*3*	*1*
PT Women	1	1	0	38	5
SE	*0*	*1*	*0*	*3*	*1*
All Stat					
PT Men	2	4	0	65	5
SE	*0*	*1*	*0*	*3*	*1*
PT Women	1	0	0	18	6
SE	*0*	*0*	*0*	*2*	*2*

Table FY.1	Percentage of sections taught by																				
	TTE %			OFT %			PT %			GTA %			Unknown %			Avg. Sec. Size			Enroll. (1000s)		
Course & Department Type	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Mathematics for Liberal Arts	16	34	40	24	22	18	17	38	30	20	0	0	23	6	12	43	33	28	43	38	60
SE	*3*	*6*	*6*	*4*	*8*	*5*	*3*	*8*	*7*	*3*	*0*	*0*	*6*	*3*	*4*	*3*	*2*	*1*	4	7	11
Finite Mathematics	10	32	43	47	26	5	14	35	40	22	0	0	7	7	12	59	29	25	27	8	25
SE	*3*	*7*	*5*	*3*	*10*	*3*	*3*	*14*	*6*	*4*	*0*	*0*	*3*	*5*	*5*	*5*	*2*	*3*	4	3	5
Business Math (non-calculus)	10	25	66	40	24	12	17	48	21	25	0	0	9	3	2	52	32	20	22	12	11
SE	*2*	*9*	*11*	*10*	*16*	*7*	*4*	*10*	*7*	*4*	*0*	*0*	*5*	*3*	*2*	*8*	*4*	*4*	5	4	3
Math for Elem Sch Teachers	20	57	53	35	21	7	15	19	27	14	0	0	16	2	12	29	28	24	15	29	36
SE	*4*	*5*	*5*	*4*	*6*	*2*	*3*	*4*	*5*	*3*	*0*	*0*	*8*	*1*	*4*	*1*	*1*	*1*	2	5	5
College Algebra	5	20	34	39	27	18	16	26	32	28	19	0	12	7	16	47	34	30	88	55	99
SE	*1*	*3*	*4*	*3*	*8*	*4*	*2*	*6*	*5*	*3*	*5*	*0*	*2*	*5*	*5*	*3*	*2*	*1*	9	7	10
Trigonometry	8	36	59	27	34	13	15	19	25	42	0	0	7	11	3	45	30	32	16	9	16
SE	*3*	*6*	*9*	*6*	*10*	*4*	*5*	*7*	*6*	*6*	*0*	*0*	*2*	*8*	*3*	*6*	*3*	*5*	3	2	4
College Alg & Trig (combined)	9	33	31	33	27	14	14	23	55	33	0	0	11	17	1	49	38	31	18	7	12
SE	*2*	*18*	*7*	*8*	*10*	*10*	*3*	*7*	*12*	*4*	*0*	*0*	*4*	*10*	*1*	*2*	*5*	*5*	3	3	6
Elem Functions, Precalculus	5	25	48	33	23	17	27	36	30	28	13	0	8	3	5	47	30	25	46	28	39
SE	*1*	*5*	*6*	*3*	*5*	*6*	*3*	*11*	*6*	*5*	*12*	*0*	*2*	*2*	*2*	*4*	*2*	*1*	4	5	5
Intro to Math Modeling	8	62	75	20	0	7	43	38	9	23	0	0	6	0	9	41	40	23	4	1	3
SE	*5*	*40*	*15*	*1*	*0*	*6*	*13*	*40*	*6*	*8*	*0*	*0*	*4*	*0*	*8*	*11*	*10*	*4*	2	1	1

Table FY.2	Univ (PhD)		Univ (MA)		College (BA)		Total	
Practices used in teaching College Algebra	% of all sections, nationally	Mean of department-reported percentages	% of all sections, nationally	Mean of department-reported percentages	% of all sections, nationally	Mean of department-reported percentages	% of all sections, nationally	Mean of department-reported percentages
a. Emphasize problem solving in the modeling sense	38	38	64	60	40	54	44	53
SE	*6*	*4*	*15*	*11*	*7*	*7*	*5*	*5*
b. Include elementary data analysis	35	24	19	27	25	26	27	26
SE	*8*	*6*	*9*	*12*	*8*	*8*	*5*	*6*
c. Include writing assignments	11	13	21	15	17	28	16	23
SE	*3*	*3*	*11*	*7*	*5*	*7*	*3*	*5*
d. Include small group activities	26	24	44	38	39	47	36	42
SE	*3*	*4*	*14*	*8*	*8*	*9*	*5*	*6*
e. Include small group projects	11	3	32	20	23	27	20	22
SE	*1*	*0*	*18*	*11*	*7*	*9*	*5*	*6*
f. Include class presentations	4	5	4	4	14	15	9	12
SE	*1*	*2*	*2*	*2*	*6*	*6*	*3*	*4*
g. Use graphing calculators	46	46	77	78	73	75	66	72
SE	*6*	*5*	*14*	*10*	*7*	*5*	*5*	*4*
h. Use spreadsheets	1	1	10	0	7	11	5	8
SE	*0*	*1*	*9*	*0*	*4*	*7*	*3*	*5*
i. Use online homework generating and grading packages	76	71	75	60	58	54	68	58
SE	*4*	*4*	*9*	*7*	*8*	*9*	*4*	*6*
j. Use classroom response systems (e.g., clickers)	13	10	0	0	10	9	9	8
SE	*3*	*3*	*0*	*0*	*6*	*6*	*3*	*4*
k. Primarily use a traditional approach	60	64	65	68	69	72	65	70
SE	*6*	*5*	*11*	*10*	*7*	*6*	*5*	*4*

Table FY.3	Percentage of sections taught by																				
	TTE %			OFT %			PT %			GTA %			Unknown %			Avg. Sec. Size			Enroll. (1000s)		
Course & Department Type	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Mainstream Calculus I																					
Lecture / recitation	33	82	50	29	18	8	12	0	32	19	0	0	7	0	10	71	39	31	70	8	28
SE	*3*	*5*	*22*	*3*	*5*	*8*	*3*	*0*	*26*	*3*	*0*	*0*	*1*	*0*	*8*	*5*	*9*	*4*	*6*	*4*	*12*
Regular section <31	41	56	70	20	22	17	5	12	11	24	0	0	9	11	2	24	25	20	7	7	35
SE	*6*	*9*	*4*	*4*	*8*	*3*	*2*	*4*	*4*	*5*	*0*	*0*	*4*	*8*	*1*	*1*	*2*	*1*	*1*	*1*	*5*
Regular section >30	25	60	63	35	8	2	9	22	13	19	5	0	11	4	22	39	35	35	34	26	18
SE	*4*	*6*	*15*	*4*	*3*	*1*	*2*	*4*	*7*	*4*	*5*	*0*	*2*	*4*	*16*	*1*	*2*	*2*	*3*	*5*	*5*
Total Mainstream Calculus I	31	63	63	30	13	12	10	16	17	20	3	0	9	5	8	52	33	25	110	41	82
SE	*2*	*4*	*9*	*2*	*4*	*2*	*1*	*3*	*8*	*2*	*3*	*0*	*2*	*2*	*5*	*3*	*2*	*1*	-	-	-
Mainstream Calculus II																					
Lecture / recitation	48	97	45	24	3	9	11	0	44	10	0	0	7	0	2	72	39	34	37	3	21
SE	*3*	*2*	*24*	*3*	*2*	*12*	*3*	*0*	*34*	*4*	*0*	*0*	*2*	*0*	*3*	*5*	*7*	*7*	*4*	*1*	*13*
Regular section <31	49	71	83	20	11	6	9	1	5	21	0	0	1	16	6	24	21	18	5	3	14
SE	*4*	*8*	*5*	*6*	*4*	*2*	*2*	*1*	*3*	*4*	*0*	*0*	*1*	*8*	*2*	*1*	*1*	*2*	*1*	*1*	*3*
Regular section >30	39	62	55	31	9	8	9	2	5	12	23	0	9	4	32	40	35	35	19	18	9
SE	*4*	*15*	*20*	*3*	*5*	*8*	*2*	*2*	*3*	*2*	*22*	*0*	*3*	*4*	*26*	*1*	*2*	*2*	*2*	*3*	*3*
Total Mainstream Calculus II	45	67	64	26	9	8	10	2	18	13	16	0	7	6	10	51	32	26	61	23	44
SE	*2*	*10*	*13*	*2*	*4*	*3*	*2*	*1*	*13*	*2*	*15*	*0*	*1*	*2*	*7*	*3*	*1*	*3*	-	-	-
Total Mainstream Calculus I & II	36	64	64	29	11	10	10	11	18	17	8	0	8	5	9	52	33	26	171	65	126
SE	*2*	*4*	*10*	*2*	*3*	*3*	*2*	*2*	*10*	*2*	*4*	*0*	*1*	*2*	*6*	*2*	*1*	*2*	-	-	-

Table FY.4	Mathematics Departments Univ (PhD)	Univ (MA)	College (BA)	Total
Percentage that offer an Honors Calculus course	65	26	10	20
SE	*4*	*6*	*3*	*2*
Of those that offer Honors Calculus, the percentage of depts that offer if for:				
Calculus I	71	73	66	69
SE	*5*	*19*	*24*	*10*
Calculus II	88	85	97	91
SE	*3*	*15*	*3*	*3*
Calculus III	74	32	17	48
SE	*4*	*18*	*18*	*8*
Of those that offer Honors Calculus, compared to Mainstream Calculus, the percentage of departments where Honors Calculus:				
Contains more theory	95	84	84	89
SE	*2*	*11*	*13*	*5*
Contains more applications	57	59	88	69
SE	*6*	*20*	*9*	*6*
Is aimed at mathematics majors	32	56	43	40
SE	*4*	*17*	*24*	*9*
Requires a test or placement mechanism as a prerequisite	75	95	59	72
SE	*4*	*4*	*23*	*9*
Can be selected by any interested student	18	5	17	15
SE	*4*	*4*	*10*	*4*

Table FY.5	Percentage of sections taught by																				
	TTE %			OFT %			PT %			GTA %			Unknown %			Avg. Sec. Size			Enroll. (1000s)		
Course & Department Type	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Non-Mainstream Calculus I																					
Lecture / recitation	31	60	29	28	20	39	17	20	26	15	0	0	9	0	6	74	33	29	27	3	5
SE	*5*	*16*	*15*	*4*	*8*	*14*	*6*	*8*	*12*	*5*	*0*	*0*	*3*	*0*	*6*	*8*	*3*	*2*			
Regular section <31	16	43	41	21	23	15	11	20	32	45	2	0	7	13	12	27	25	22	6	3	7
SE	*8*	*11*	*10*	*9*	*7*	*9*	*5*	*14*	*10*	*21*	*1*	*0*	*3*	*8*	*7*	*3*	*1*	*2*			
Regular section >30	18	31	44	33	16	13	13	38	25	24	0	0	13	15	18	52	39	36	27	15	5
SE	*4*	*9*	*9*	*5*	*10*	*7*	*3*	*6*	*18*	*3*	*0*	*0*	*5*	*14*	*15*	*3*	*6*	*3*			
Total Non-Mainstream Calculus I	22	38	39	29	18	20	14	32	29	25	0	0	10	12	12	54	35	27	60	22	17
SE	*3*	*6*	*7*	*5*	*6*	*8*	*3*	*5*	*6*	*5*	*0*	*0*	*3*	*8*	*4*	*3*	*4*	*1*			
Total Non-Mainstream Calculus II	18	22	60	21	32	0	12	44	10	25	0	0	24	3	31	35	33	19	12	5	5
SE	*3*	*12*	*21*	*3*	*5*	*0*	*4*	*10*	*9*	*7*	*0*	*0*	*9*	*3*	*27*	*5*	*3*	*8*			
Total Non-Mainstream Calculus I & II	21	35	45	27	21	14	13	34	23	25	0	0	13	11	18	50	35	25	72	27	23
SE	*3*	*6*	*6*	*3*	*5*	*6*	*3*	*5*	*6*	*5*	*0*	*0*	*3*	*6*	*10*	*3*	*3*	*3*			

Table FY.6	Percentage of sections taught by																				
	TTE %			OFT %			PT %			GTA %			Unknown %			Avg. Sec. Size			Enroll. (1000s)		
Course & Department Type	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Elementary Stat. (F1) (non-calculus)																					
Lecture / recitation	36	66	43	22	18	3	10	3	32	21	0	0	11	13	21	48	38	30	6	6	34
SE	*4*	*10*	*6*	*10*	*11*	*2*	*4*	*3*	*12*	*12*	*0*	*0*	*6*	*8*	*11*	*7*	*7*	*4*			
Regular section <31	6	39	50	28	22	16	6	35	27	29	1	0	31	3	8	27	20	22	4	4	46
SE	*2*	*10*	*6*	*7*	*6*	*4*	*3*	*16*	*6*	*5*	*1*	*0*	*8*	*3*	*3*	*4*	*3*	*1*			
Regular section >30	23	50	56	25	15	16	20	30	8	31	0	0	1	5	21	65	38	37	28	16	30
SE	*4*	*5*	*6*	*6*	*6*	*6*	*3*	*8*	*3*	*5*	*0*	*0*	*1*	*4*	*4*	*10*	*4*	*1*			
Total Elementary Statistics	22	50	49	25	18	12	15	26	24	29	0	0	9	6	14	55	33	27	38	27	110
SE	*3*	*5*	*3*	*4*	*4*	*2*	*2*	*6*	*4*	*4*	*0*	*0*	*3*	*3*	*4*	*7*	*4*	*1*			
Probability & Statistics (non-Calculus) (F3 + F4)	30	52	47	17	10	7	15	24	21	20	5	7	18	9	18	57	32	25	4	7	9
SE	*9*	*11*	*10*	*5*	*5*	*4*	*5*	*9*	*13*	*7*	*3*	*6*	*7*	*6*	*9*	*11*	*3*	*3*			
Total, all non-calculus elementary probability & statistics courses	23	51	49	24	16	12	15	25	24	28	1	1	10	7	14	55	33	27	42	34	119
SE	*3*	*4*	*3*	*4*	*4*	*2*	*2*	*5*	*4*	*4*	*1*	*1*	*3*	*3*	*3*	*6*	*3*	*1*			

Table FY.7	Mathematics Departments Univ (PhD)	*SE*	Univ (MA)	*SE*	College (BA)	*SE*	Total	*SE*
Percentage of departments that offer elementary statistics course with no calculus prerequisite	58	*3*	90	*6*	87	*4*	84	*3*
Of those that offer the course, the percentage of departments in which the majority of sections use real data for the following percentages of class sessions:								
0-20%	33	*7*	29	*8*	15	*5*	18	*4*
21-40%	18	*6*	15	*8*	30	*5*	27	*4*
41-60%	26	*5*	14	*6*	20	*5*	19	*4*
61-80%	5	*2*	12	*6*	18	*4*	16	*4*
81-100%	18	*4*	30	*11*	18	*4*	20	*4*
Percentage of departments where the majority of sections use in-class demonstrations for the following percentages of class sessions:								
0-20%	36	*4*	23	*7*	10	*3*	14	*2*
21-40%	21	*5*	9	*5*	33	*6*	29	*5*
41-60%	20	*5*	16	*6*	11	*3*	13	*3*
61-80%	6	*3*	16	*8*	29	*5*	25	*4*
81-100%	16	*4*	35	*10*	17	*3*	19	*3*
Percentage of departments using the following kinds of technology in the majority of sections:								
Graphing calculators	52	*5*	79	*5*	72	*5*	71	*4*
Statistical packages	49	*5*	63	*8*	54	*5*	55	*4*
Educational software	26	*5*	16	*6*	18	*4*	19	*3*
Applets	20	*5*	15	*6*	17	*5*	17	*4*
Spreadsheets	57	*7*	55	*8*	50	*6*	51	*5*
Web-based resources	61	*4*	53	*10*	54	*8*	54	*7*
Classroom response systems	11	*3*	9	*4*	10	*4*	10	*3*
Percentage of departments where the majority of sections require assessments beyond homework, exams, and quizzes	24	*6*	51	*8*	46	*6*	45	*5*

Table FY.8	Statistics Departments Univ (PhD)	*SE*	Univ (MA)	*SE*	Total	*SE*
Percentage of departments that offer Introductory Statistics for non-majors/minors with no calculus prerequisite	90	*3*	85	*7*	88	*3*
Of those that offer the course, the percentage of departments in which the majority of sections use real data the following percentages of the time						
0-20%	6	*2*	20	*9*	9	*3*
21-40%	16	*3*	20	*9*	17	*3*
41-60%	21	*3*	0	.	16	*3*
61-80%	24	*4*	10	*7*	20	*3*
81-100%	34	*4*	50	*12*	38	*4*
Percentage of departments where the majority of sections use in-class demonstrations in the following percentages of class sessions:						
0-20%	22	*4*	10	*7*	19	*3*
21-40%	16	*3*	40	*11*	22	*4*
41-60%	21	*4*	0	.	16	*3*
61-80%	16	*3*	20	*9*	17	*3*
81-100%	24	*4*	30	*11*	26	*4*
Percentage of departments using following kinds of technology in the majority of sections						
Graphing calculators	45	*4*	33	*12*	43	*4*
Statistical packages	89	*3*	80	*9*	87	*3*
Educational software	38	*4*	44	*12*	40	*4*
Applets	31	*4*	44	*12*	34	*4*
Spreadsheets	45	*4*	56	*12*	48	*4*
Web-based resources	79	*4*	60	*11*	74	*4*
Classroom response systems	26	*4*	40	*11*	29	*4*
Percentage of departments where the majority of sections require assessments beyond homework, exams, and quizzes	31	*4*	50	*12*	36	*4*

	Percentage of sections taught by															
Table FY.9	TTE %		OFT (w PhD) %		OFT (w/o PhD) %		PT %		GTA %		Unk. %		Avg. Sec. Size		Enroll. (1000s)	
Course & Statistics Department Type	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA
Introductory Statistics (non-Calculus for non-majors/minors)																
Lecture / recitation	19	27	11	5	13	5	11	17	18	5	27	41	65	54	29	9
SE	*2*	*9*	*2*	*3*	*2*	*4*	*2*	*10*	*5*	*4*	*3*	*26*	*8*	*10*		
Regular section <31	32	49	17	1	0	27	13	23	15	0	24	0	16	26	1	4
SE	*6*	*19*	*5*	*2*	*0*	*14*	*4*	*7*	*5*	*0*	*5*	*0*	*2*	*5*		
Regular section >30	17	63	5	0	4	9	4	24	39	0	31	4	47	29	10	4
SE	*3*	*10*	*2*	*0*	*1*	*8*	*2*	*4*	*6*	*0*	*6*	*4*	*2*	*4*		
Total Introductory Statistics (non-Calculus)	19	44	10	2	9	13	9	21	24	2	28	17	55	37	40	17
SE	*2*	*8*	*2*	*1*	*1*	*6*	*1*	*3*	*4*	*1*	*3*	*11*	*4*	*3*		
Introductory Statistics (calculus prerequisite for non-majors/minors)																
Lecture / recitation	36	32	14	32	4	0	11	5	13	0	23	32	50	34	6	1
SE	*5*	*13*	*2*	*10*	*2*	*0*	*2*	*9*	*4*	*0*	*4*	*10*	*5*	*22*		
Regular section <31	32	67	10	6	1	6	3	3	6	11	47	8	15	44	1	3
SE	*10*	*22*	*4*	*3*	*0*	*5*	*2*	*2*	*1*	*9*	*16*	*5*	*5*	*15*		
Regular section >30	39	76	13	6	1	0	17	6	17	6	13	6	36	42	4	1
SE	*4*	*8*	*2*	*4*	*0*	*0*	*4*	*5*	*3*	*5*	*2*	*4*	*3*	*9*		
Total Introductory Statistics (Calculus)	36	59	13	13	2	3	11	4	12	7	26	15	36	40	11	5
SE	*4*	*11*	*1*	*5*	*1*	*2*	*2*	*2*	*2*	*4*	*4*	*5*	*3*	*7*		

Table TYE.1 See NCES source.

Table TYE.2	2010
Mathematics & Statistics enrollments in TYCs	2,105,000
SE	111,000

Table TYE.3

Course Number	Type of course	2010	*SE*
	Precollege level		
1	Arithmetic & Basic Mathematics	146	*22*
2	Pre-algebra	226	*30*
3	Elementary Algebra (High School level)	428	*38*
4	Intermediate Algebra (High School level)	344	*25*
5	Geometry (High School level)	6	*1*
	Precalculus level		
6	College Algebra (above Intermediate Algebra)	230	*28*
7	Trigonometry	45	*6*
8	College Algebra & Trigonometry (combined)	11	*3*
9	Introduction to Mathematical Modeling	18	*9*
10	Precalculus/Elem Functions/Analytic Geometry	64	*7*
	Calculus level		
11	Mainstream Calculus I	65	*5*
12	Mainstream Calculus II	29	*2*
13	Mainstream Calculus III	15	*1*
14	Non-mainstream Calculus I	20	*3*
15	Non-mainstream Calculus II	2	*1*
16	Differential Equations	6	*1*
	Other mathematics courses		
17	Linear Algebra	5	*1*
18	Discrete Mathematics	2	*1*
19	Elementary Statistics (with or w/o Probability)	134	*12*
20	Probability (with or w/o Statistics)	3	*1*
21	Finite Mathematics	18	*4*
22	Mathematics for Liberal Arts	91	*12*
23	Mathematics for Elementary School Teachers I	21	*3*
24	Mathematics for Elementary School Teachers II	8	*1*
25	Other Mathematics Courses for Teacher Preparation	1	*0*
26	Business Mathematics (not transferable)	16	*5*
27	Business Mathematics (transferable)	4	*2*
28	Technical Math (non-calculus-based)	17	*8*
29	Technical Math (calculus-based)	1	*1*
30	Other Mathematics Courses (not transferable)	33	*17*
31	Other Mathematics Courses (transferable)	14	*5*
	Total all Two-year College math courses	2024	*109*

Table TYE.4		
Course numbers	Type of course	2010
1-5	Precollege Level	1150
	SE	*86*
6-10	Precalculus Level	368
	SE	*31*
11-16	Calculus Level	138
	SE	*10*
19-20	Statistics, Probability	137
	SE	*12*
17-18 & 21-31	Remaining Courses	231
	SE	*25*
1-31	Total, all courses	2024
	SE	*109*

Table TYE.5

Course number	Type of course	Fall 2010	*SE*
1	Arithmetic & Basic Mathematics	50	*5*
2	Pre-algebra	49	*6*
3	Elementary Algebra (High School level)	82	*4*
4	Intermediate Algebra (High School level)	79	*5*
5	Geometry (High School level)	7	*2*
6	College Algebra (above Intermediate Algebra)	76	*7*
7	Trigonometry	55	*6*
8	College Algebra & Trigonometry (combined)	12	*3*
9	Introduction to Mathematical Modeling	9	*3*
10	Precalculus/ Elementary Functions/ Analytic Geometry	53	*6*
11	Mainstream Calculus I	79	*6*
12	Mainstream Calculus II	61	*6*
13	Mainstream Calculus III	56	*5*
14	Non-mainstream Calculus I	25	*4*
15	Non-mainstream Calculus II	5	*2*
16	Differential Equations	21	*3*
17	Linear Algebra	19	*3*
18	Discrete Mathematics	11	*3*
19	Elementary Statistics (with or w/o Probability)	73	*8*
20	Probability (with or w/o Statistics)	5	*2*
21	Finite Mathematics	27	*4*
22	Mathematics for Liberal Arts	44	*5*
23	Mathematics for Elementary School Teachers I	55	*5*
24	Mathematics for Elementary School Teachers II	27	*5*
25	Other Mathematics Courses for Teacher Preparation	2	*1*
26	Business Mathematics (not transferable)	20	*5*
27	Business Mathematics (transferable)	6	*2*
28	Technical Mathematics (non-calculus-based)	26	*6*
29	Technical Mathematics (calculus-based)	3	*2*
30	Other Mathematics Courses (not transferable)	19	*4*
31	Other Mathematics Courses (transferable)	18	*6*

Table TYE.6			
Course number	Type of course	2010	*SE*
11	Mainstream Calculus I	79	*6*
16	Differential Equations	21	*3*
17	Linear Algebra	19	*3*
18	Discrete Mathematics	11	*3*
19	Elementary Statistics (with or w/o Probability)	73	*8*
21	Finite Mathematics	27	*4*
22	Mathematics for Liberal Arts	44	*5*
23	Mathematics for Elementary School Teachers I	55	*5*
28	Technical Mathematics (non-calculus-based)	26	*6*
29	Technical Mathematics (calculus-based)	3	*2*

Table TYE.7		2010			
Course numbers	Type of course	avg. sec. size	*SE*	% of sections with size > 30	*SE*
1-5	Precollege Level	24.0	*1*	20%	*4*
6-10	Precalculus Level	26.0	*1*	34%	*4*
11-16	Calculus Level	21.0	*4*	25%	*5*
19-20	Elem. Statistics, Probability	28.0	*1*	38%	*5*
1-31	Total, all courses	24.0	*1*	23%	*3*

Table TYE.7.1		2010			
Course numbers	Type of course	avg. sec. size	*SE*	% of sections with size > 30	*SE*
1-5	Precollege Level	23	*2*	23%	*6*
6-10	Precalculus Level	22	*1*	12%	*4*
11-16	Calculus Level	15	*2*	0%	*0*
19-20	Elem. Statistics, Probability	24	*1*	15%	*4*
1-31	Total, all courses	22	*1*	10%	*3*

Table TYE.8

Course number	Type of course	Avg. sec. size	*SE*	Course number	Type of course	Avg. sec. size	*SE*
1	Arithmetic & Basic Mathematics	24	*1*	17	Linear Algebra	20	*1*
2	Pre-algebra	21	*4*	18	Discrete Mathematics	18	*2*
3	Elementary Algebra (High School level)	24	*1*	19	Elementary Statistics (with or w/o Probability)	28	*1*
4	Intermediate Algebra (High School level)	25	*1*	20	Probability (with or w/o Statistics)	22	*4*
5	Geometry (High School level)	26	*3*	21	Finite Mathematics	23	*1*
6	College Algebra (above Intermediate Algebra)	26	*1*	22	Mathematics for Liberal Arts	27	*1*
7	Trigonometry	27	*1*	23	Mathematics for Elementary School Teachers I	19	*2*
8	College Algebra & Trigonometry (combined)	22	*2*	24	Mathematics for Elementary School Teachers II	17	*1*
9	Introduction to Mathematical Modeling	28	*2*	25	Other Mathematics Courses for Teacher Preparation	23	*3*
10	Precalculus/Elem Functions/Analytic Geometry	26	*1*	26	Business Math (not transferable)	22	*2*
11	Mainstream Calculus I	20	*6*	27	Business Math (transferable)	27	*2*
12	Mainstream Calculus II	24	*1*	28	Technical Math (non-calculus-based)	21	*2*
13	Mainstream Calculus III	20	*1*	29	Technical Math (calculus-based)	22	*10*
14	Non-mainstream Calculus I	21	*5*	30	Other Mathematics Courses (not transferable)	21	*4*
15	Non-mainstream Calculus II	27	*3*	31	Other Mathematics Courses (transferable)	23	*1*
16	Differential Equations	23	*1*				

Table TYE.8.1

Course number	Type of course	Avg. sec. size	*SE*	Course number	Type of course	Avg. sec. size	*SE*
1	Arithmetic & Basic Mathematics	22	*1*	17	Linear Algebra	20	-
2	Pre-algebra	23	*3*	18	Discrete Mathematics	15	*6*
3	Elementary Algebra (High School level)	24	*2*	19	Elementary Statistics (with or w/o Probability)	24	*1*
4	Intermediate Algebra (High School level)	22	*2*	20	Probability (with or w/o Statistics)	11	-
5	Geometry (High School level)	na		21	Finite Mathematics	20	*3*
6	College Algebra (above Intermediate Algebra)	23	*1*	22	Mathematics for Liberal Arts	24	*1*
7	Trigonometry	24	*3*	23	Mathematics for Elementary School Teachers I	19	*2*
8	College Algebra & Trigonometry (combined)	23	*2*	24	Mathematics for Elementary School Teachers II	18	*4*
9	Introduction to Mathematical Modeling	17	*6*	25	Other Mathematics Courses for Teacher Preparation	na	
10	Precalculus/Elem Functions/Analytic Geometry	20	*2*	26	Business Math (not transferable)	24	*1*
11	Mainstream Calculus I	15	*1*	27	Business Math (transferable)	24	*4*
12	Mainstream Calculus II	8	*7*	28	Technical Math (non-calculus-based)	17	*8*
13	Mainstream Calculus III	4		29	Technical Math (calculus-based)	13	*15*
14	Non-mainstream Calculus I	19	*3*	30	Other Mathematics Courses (not transferable)	12	*12*
15	Non-mainstream Calculus II	na		31	Other Mathematics Courses (transferable)	22	*5*
16	Differential Equations	na					

Table TYE.9		2010					
Course number	Type of course	# of sections	*SE*	# of sec. taught by PT fac.	*SE*	% of sec. taught by PT fac.	*SE*
1-5	Precollege level	45131	*4058*	26069	*2791*	58%	*5*
6-10	Precalculus level	12588	*1076*	3940	*453*	31%	*3*
11-13	Mainstream Calculus	5155	*898*	558	*83*	11%	*3*
14-15	Non-mainstream Calculus	959	*223*	259	*70*	27%	*8*
16-18	Advanced level	616	*70*	69	*25*	11%	*4*
19-20	Statistics, Probability	4090	*364*	1573	*192*	38%	*3*
21-27	Service courses	5673	*548*	2258	*268*	40%	*3*
28-29	Technical mathematics	1533	*634*	264	*83*	17%	*11*
30-31	Other mathematics courses	2272	*707*	974	*533*	43%	*18*
1-31	Total, all courses	78018	*5634*	35965	*3198*	46%	*4*

Table TYE.10		% of sections taught that							
Course Nbr.	Type of course	Use computer algebra system %	SE	Use commerc. produced electronic instruct. packages %	SE	taught mostly by the standard lecture method %	SE	Total # of on-campus sec. in fall 2010	SE
1	Arithmetic & Basic Mathematics	8	4	32	8	66	8	5652	940
2	Pre-algebra	9	5	40	10	54	11	10183	1784
3	Elementary Algebra (High School level)	7	3	33	5	76	4	16236	1443
4	Intermediate Algebra (High School level)	8	3	31	5	69	5	12843	1101
5	Geometry (High School level)	0	0	0	0	77	18	217	64.95
6	College Algebra (above Intermed. Algebra)	6	4	34	6	79	6	7628	962.5
7	Trigonometry	4	3	23	6	91	3	1540	183.9
8	College Algebra & Trigonometry (combined)	12	12	20	11	89	5	413	141.5
9	Introduction to Mathematical Modeling	0	0	11	10	95	6	618	298.8
10	Precalculus/Elem Functions/Analytic Geome	2	1	20	6	84	5	2389	261.9
11	Mainstream Calculus I	9	3	12	5	66	18	3166	823.6
12	Mainstream Calculus II	9	3	11	3	85	5	1223	98
13	Mainstream Calculus III	20	7	8	3	85	5	766	63
14	Non-mainstream Calculus I	0	0	22	10	72	15	895	216
15	Non-mainstream Calculus II	0	0	0	0	83	8	64	24
16	Differential Equations	14	5	6	4	81	7	266	34.34
17	Linear Algebra	8	8	8	8	87	6	239	41.03
18	Discrete Mathematics	0	0	0	0	77	12	111	25
19	Elementary Statistics (with or w/o Probability)	2	1	19	5	81	5	3965	359.2
20	Probability (with or w/o Statistics)	15	17	53	29	100	0	126	61
21	Finite Mathematics	4	4	26	12	82	8	703	126.3
22	Mathematics for Liberal Arts	1	1	12	4	88	5	2857	402.4
23	Mathematics for Elementary School Teachers I	7	3	4	2	71	8	973	148.1
24	Mathematics for Elementary School Teacher	5	5	3	3	80	8	366	66.03
25	Other Mathematics Courses for Teacher Preparation	0	0	0	0	86	11	28	12.03
26	Business Math (not transferable)	3	3	4	2	68	14	602	170.9
27	Business Math (transferable)	0	0	20	13	91	7	143	51
28	Technical Math (non-calculus-based)	1	2	10	8	28	16	1203	449.1
29	Technical Math (calculus-based)	0	0	0	0	3	2	330	231.3
30	Other Mathematics Courses (not transferable)	0	0	46	38	87	14	1488	641
31	Other Mathematics Courses (transferable)	1	1	5	5	54	31	784	325.8

Table TYE.11

Course Number	Type of course	Accelerated Sections	Slower-Paced Sections	Learning Communities	Summer Boot Camp	Not applicable (course not offered)
1	Arithmetic & Basic Mathematics	22	23	17	13	34
	SE	*5*	*6*	*3*	*4*	*5*
2	Pre-algebra	35	22	15	8	30
	SE	*5*	*5*	*3*	*2*	*6*
3	Elementary Algebra (High School level)	49	29	16	15	15
	SE	*5*	*6*	*3*	*4*	*5*
4	Intermediate Algebra (High School level)	38	22	10	10	15
	SE	*5*	*5*	*3*	*3*	*5*

Table TYE.11.1

			Most sophisticated technology that is required or allowed:					
Course Nbr.	**Type of course**	No Calculator Allowed	Four-Function Calculator	Scientific Calculator	Graph. Calc.	Computer-Based Tools	No Dept. Policy	Not applicable (course not offered)
1	Arithmetic & Basic Mathematics	43	7	12	1	3	8	26
	SE	*6*	*2*	*4*	*1*	*1*	*4*	*5*
2	Pre-Algebra	26	10	22	5	6	7	24
	SE	*5*	*3*	*4*	*2*	*2*	*2*	*5*
3	Elementary Algebra (High School level)	13	8	32	18	6	19	4
	SE	*4*	*3*	*5*	*4*	*2*	*5*	*3*
4	Intermediate Algebra (High School level)	4	3	23	42	7	17	4
	SE	*2*	*1*	*5*	*5*	*2*	*5*	*3*

Table TYE.11.2	% of prog.	*SE*
A. Percentage of all departments that offer College Algebra	84	*5*
B. Purpose of College Algebra programs is to		
a. Prepare students for Trigonometry, Engineering, or other Calculus	84	*4*
b. Prepare students for Business Calculus but not Engineering Calculus	55	*6*
c. Strengthen general quantitative literacy	73	*5*
d. Provide an option to students taking no further math	68	*6*
C. Course content primarily taught through modeling and problem solving	26	*5*
D. Department policy either requires or allows:		
a. Scientific calculator	59	*6*
b. Graphing calculator	65	*6*
c. Calculators with Algebra System	7	*2*
E. Use of technology		
a. Instructors and/or students use spreadsheets	20	*5*
b. Students use commercial programs	59	*6*
c. Students use computer algebra systems	24	*5*
d. Students are required to submit homework via an online platform	49	*5*
e. Offer web-based resources	47	*5*

Table TYE.12		2010					
Course Nbr.	Type of course	Total Enroll. (1000s)	*SE*	Dist. Enroll. (1000s)	*SE*	% Dist. Enroll.	*SE*
1	Arithmetic & Basic Mathematics	146	*22*	11	*5*	7	*4*
2	Pre-algebra	226	*30*	14	*6*	6	*3*
3	Elementary Algebra (High School level)	428	*38*	37	*11*	9	*2*
4	Intermediate Algebra (High School level)	344	*25*	25	*5*	7	*1*
5	Geometry (High School level)	6	*1*	0	*0*	0	*0*
6	College Algebra (above Intermed. Algebra)	230	*28*	32	*8*	14	*3*
7	Trigonometry	45	*6*	4	*2*	10	*3*
8	College Algebra & Trigonometry (combined)	11	*3*	1	*1*	12	*6*
9	Introduction to Mathematical Modeling	18	*9*	1	*0*	4	*4*
10	Precalculus/ Elementary Functions/ Analytic Geometry	64	*7*	3	*1*	5	*2*
11	Mainstream Calculus I	65	*5*	2	*1*	3	*1*
12	Mainstream Calculus II	29	*2*	0	*0*	1	*1*
13	Mainstream Calculus III	15	*1*	0	*0*	0	*0*
14	Non-mainstream Calculus I	20	*3*	2	*1*	8	*2*
15	Non-mainstream Calculus II	2	*1*	0	*0*	0	*0*
16	Differential Equations	6	*1*	0	*0*	2	*2*
17	Linear Algebra	5	*1*	0	*0*	4	*4*
18	Discrete Mathematics	2	*1*	0	*0*	12	*8*
Table TYE.12 (continued)							
19	Elementary Statistics (with or w/o Probability)	134	*12*	23	*4*	17	*2*
20	Probability (with or w/o Statistics)	3	*1*	0	*0*	7	*8*
21	Finite Mathematics	18	*4*	2	*1*	11	*3*
22	Math for Liberal Arts	91	*12*	15	*4*	17	*3*
23	Mathematics for Elementary School Teachers I	21	*3*	2	*1*	11	*4*
24	Mathematics for Elementary School Teachers II	8	*1*	2	*1*	20	*7*
25	Other Mathematics Courses for Teacher Preparation	1	*0*	0	*0*	0	*0*
26	Business Math (not transferable)	16	*5*	3	*1*	19	*4*
27	Business Math (transferable)	4	*2*	0	*0*	7	*6*
28	Technical Math (non-calculus)	17	*8*	1	*1*	7	*6*
29	Technical Math (calculus)	1	*1*	0	*0*	37	*29*
30	Other Math Courses (not transferable)	33	*17*	2	*1*	7	*2*
31	Other Math Courses (transferable)	14	*5*	3	*1*	19	*9*

Table TYE.12.1	% of Progs.	SE
A. Goals of distance learning generally the same as face-to-face courses		
a. Yes	88	4
b. No	0	-
c. Do not have distance learning	12	4
B. Instructional materials created by:		
a. Faculty	10	2
b. Commercially produced materials	12	4
c. Combination of both	78	5
C. Format of majority of distance learning		
a. Complete online	73	6
b. Hybrid	22	5
c. Other	5	3
D. Requirements of distance learning faculty to meet with students		
a. Never	8	3
b. For scheduled meetings	6	3
c. Specified office hours per week	21	5
d. Not applicable	65	5
E. How distance learning students take majority of tests		
a. Complete online and unproctored	11	4
b. At proctored testing site	42	5
c. Combination of both	47	4
F. Exams when there are multiple instructors		
a. No common departmental exams	39	6
b. Common departmental exams for some courses	20	4
c. Common departmental exams for all courses	23	4
G. Are some courses in both non-distance and distance learning formats		
a. Yes	97	2
b. No	3	2
H. Distance learning practices		
a. Same exams as in face-to-face	47	5
b. Same outlines as in face-to-face	96	2
c. Same course projects	49	5
I. Distance learning instructors evaluated in same way		
a. Yes	78	4
b. No	22	4

Table TYE.13		
Opportunity/Service	2010	*SE*
A. Diagnostic or placement testing	90	*4*
a. Colleges that usually require placement tests of first-time enrollees	100	*0*
b. Colleges that use placement tests as part of mandatory placement	98	*2*
c. Colleges that periodically assess the effectiveness of their placement tests	75	*6*
B. Mathematics lab or tutorial center	*	
C. Advising by a member of the mathematics faculty	42	*5*
D. Opportunities to compete in mathematics contests	41	*4*
E. Honors sections	20	*3*
F. Mathematics club	31	*5*
G. Special mathematics programs to encourage minorities	11	*3*
H. Lectures/colloquia for students, not part of math club	16	*4*
I. Special mathematics programs to encourage women	6	*2*
J. K-12 outreach opportunities	32	*5*
K. Undergraduate research opportunities	14	*4*
L. Independent mathematics studies	36	*5*
M. Other	13	*6*

Table TYE.14		2010	
Course Number	Type of course	Enroll. (1000s)	*SE*
1-2	Arithmetic & Basic Math, Pre-algebra	48	*15*
3	Elementary Algebra (High School level)	38	*14*
4	Intermediate Algebra (High School level)	29	*14*
19-20	Elementary Statistics, Probability	12	*4*
26-27	Business Mathematics	19	*3*
28-29	Technical Mathematics	7	*3*
	Total	152	*40*

Table TYE.15		Mathematics Enrollment (in 1000s) in Other Programs			
Course Number	Type of course	Developmental Education Dept/Division	Occupational Programs	Business	Other Depts/ Divisions
1-2	Arithmetic & Basic Math, Pre-algebra	47	1	0	0
	SE	*15*	*0*	*0*	*0*
3	Elementary Algebra (High School level)	36	0	1	0
	SE	*14*	*0*	*1*	*0*
4	Intermediate Algebra (High School level)	29	0	0	0
	SE	*14*	*0*	*0*	*0*
19-20	Elementary Statistics, Probability	0	0	9	3
	SE	*0*	*0*	*3*	*1*
26-27	Business Mathematics	0	1	18	0
	SE	*0*	*1*	*4*	*0*
28-29	Technical Mathematics	0	4	1	2
	SE	*0*	*2*	*1*	*1*
	Total	112	5	29	6
	SE	*40*	*2*	*5*	*2*

Table TYE.16			
Mathematics Outside of the Mathematics Department		2010	*SE*
Percentage of Two-year Colleges with some precollege mathematics courses outside of mathematics department control		29	*7*
Course number	Type of Course		
1-2	Arithmetic & Basic Math, Pre-algebra	24	*7*
3	Elementary Algebra (High School level)	13	*6*
4	Intermediate Algebra (High School level)	7	*3*

Table TYF.1		
Two-Year Colleges	2010	*SE*
Full-time permanent faculty	9790	*387*
Full-time temporary faculty	1083	*417*
Part-time faculty paid by TYC	23453	*1568*
Part-time, paid by third party	2323	*420*

	Teaching assignment in weekly contact hours					
Table TYF.2	<10	10 to 12	13 to 15	16 to 18	19 to 21	>21
Percentage of two-year colleges	3	7	76	8	3	3
SE	*3*	*4*	*6*	*2*	*2*	*2*

Full-time Permanent Faculty	2010	*SE*
A. Average weekly contact hours:	15	*1*
B. Percentage who teach extra hours for extra pay at their own two-year college:	65%	*3*
C. Percentage teaching 1-3 extra hours for extra pay:	47%	*4*
D. Percentage teaching 4-6 extra hours for extra pay:	39%	*3*
E. Percentage teaching 7 or more extra hours for extra pay:	14%	*2*
Part-time Faculty		
F. Percentage who teach 6 or more hours weekly:	54%	*5*
G. Percentage of two-year colleges requiring part-time faculty to hold office hours:	28%	*5*

Table TYF.3	Estimate	*SE*
Number no longer part of 2010-2011 faculty	459	*81*
Total full-time permanent faculty, fall 2010	9790	*387*

Table TYF.4	% of full-time permanent faculty	
Highest degree	2010	*SE*
Doctorate	14	*2*
Masters	83	*2*
Bachelors	3	*1*
Number of full-time permanent faculty	9790	*387*

Table TYF.5	Percentage having as highest degree			
Field of degree	Doctorate	Masters	Bachelors	Total Percent in Field
Mathematics	8	60	1	68
SE	*1*	*3*	*0*	*2*
Statistics	0	2	0	3
SE	*0*	*1*	*0*	*1*
Mathematics Education	3	17	1	21
SE	*1*	*2*	*1*	*2*
Other fields	2	5	0	7
SE	*1*	*1*	*0*	*1*
Total Percentage by highest degree	14	83	3	
SE	*2*	*2*	*1*	

Table TYF.6	% of part-time faculty	
Highest degree	2010	*SE*
Doctorate	5	*1*
Masters	73	*3*
Bachelors	22	*3*
Number of part-time faculty	25775	*1592*

Table TYF.7	Percentage having as highest degree			
Field of degree	Doctorate	Masters	Bachelors	Total Percent in Field
Mathematics	2	35	11	48
SE	*0*	*3*	*2*	*4*
Mathematics Education	1	20	5	26
SE	*0*	*2*	*2*	*3*
Statistics	0	2	0	2
SE	*0*	*0*	*0*	*0*
Other fields	1	17	6	24
SE	*0*	*2*	*2*	*3*
Total Percentage by highest degree	5	73	22	
SE	*1*	*3*	*3*	

Table TYF.8	2010	SE
Men	4866	251
	50%	2%
Women	4924	278
	50%	2%

Table TYF.9	% of Full-time permanent faculty	% of Part-time faculty
Men	50	51
SE	2	2
Women	50	49
SE	2	2
Total Number	9790	23453
SE	387	1568

Table TYF.10	2010	SE
Percentage of ethnic minorities among full-time permanent faculty	16%	2%
Number of full-time permanent ethnic minority faculty	1566	155
Number of full-time permanent faculty	9790	387

Table TYF.11	% of full-time permanent faculty	
Ethnic Group	2010	SE
American Indian/Eskimo/Aleut	0	0
Asian/Pacific Islander	6	1
Black (non-Hispanic)	6	1
Mexican American/Puerto Rican/ other Hispanic	4	1
White (non-Hispanic)	79	2
Status unknown	5	2

Table TYF.12			
Ethnic Group	Number of full-time permanent faculty	% of ethnic group among all full-time permanent faculty	% of women within ethnic group
American Indian, Alaskan Native	20	0	63
SE	*12*	*0*	*45*
Asian	605	6	48
SE	*100*	*1*	*7*
Native Hawaiian, Pacific Islander	42	0	49
SE	*16*	*0*	*25*
Black or African American (non-Hispanic)	544	6	37
SE	*75*	*1*	*6*
Mexican American,Puerto Rican or other Hispanic	356	4	34
SE	*53*	*1*	*7*
White (non-Hispanic)	7733	79	52
SE	*408*	*2*	*2*
Status not known or other	490	5	50
SE	*209*	*2*	*12*

Table TYF.13	Percentage among	
Ethnic Group	All full-time permanent faculty	Full-time permanent faculty under age 40
Ethnic Minorities	16	18
SE	*2*	*3*
White (non-Hispanic)	79	74
SE	*2*	*5*
Unknown	5	8
SE	*2*	*5*

Table TYF.14	2010
Percentage of ethnic minorities among part-time faculty	17
SE	*2*

Table TYF.15			
Ethnic Group	Number of part-time faculty	% of ethnic group among all part-time faculty	% of women within ethnic group
American Indian, Alaskan Native	44	0	6
SE	*26*	*0*	*9*
Asian	1341	6	49
SE	*206*	*1*	*5*
Native Hawaiian, Pacific Islander	59	0	34
SE	*34*	*0*	*49*
Black or African American (non-Hispanic)	1796	8	36
SE	*230*	*1*	*3*
Mexican American,Puerto Rican or other Hispanic	762	3	44
SE	*151*	*1*	*7*
White (non-Hispanic)	18105	77	51
SE	*1477*	*3*	*2*
Status not known or other	1346	6	46
SE	*666*	*3*	*7*

Table TYF.16	% of full-time permanent faculty		Number of full-time permanent faculty	
Age	2010	*SE*	2010	*SE*
<30	8	*2*	832	*158*
30-34	9	*1*	893	*117*
35-39	12	*1*	1189	*107*
40-44	14	*2*	1416	*142*
45-49	15	*1*	1475	*113*
50-54	11	*1*	1085	*115*
55-59	13	*1*	1268	*149*
>59	17	*2*	1631	*176*

Table TYF.17	% of full-time permanent faculty		% of women in age group
Age	Women	Men	
<35	10	8	57
SE	*1*	*1*	*4*
35-44	13	13	53
SE	*1*	*1*	*3*
45-54	13	14	48
SE	*1*	*1*	*3*
>54	14	16	47
SE	*1*	*2*	*4*

Table TYF.18		
Percentage of new faculty from:	2010	*SE*
A. Graduate School	23	*6*
B. Teaching in a four-year college or university	3	*2*
C. Teaching in another two-year college	18	*5*
D. Teaching in a secondary school	25	*9*
E. Part-time or full-time temporary employment at the same college	23	*5*
F. Nonacademic employment	1	*1*
G. Unemployed	0	*0*
F. Unknown	6	*3*
Total Number Hired	777	*103*

Table TYF.19	% of New Hires	
Highest Degree	2010-2011	*SE*
Doctorate	11	*3*
Masters	82	*4*
Bachelors	2	*1*
Unknown	4	*2*

Table TYF.20				
Ethnic Group	% of new hires for 2010-2011	SE	% of women in ethnic group	SE
American Indian	0	*0*	100	-
Asian/Pacific Islander	9	*3*	70	*25*
Black (non-Hispanic)	5	*2*	27	*29*
Hispanic	4	*2*	36	*14*
White (non-Hispanic)	78	*5*	49	*8*
Other	1	*1*	0	-
Unknown	3	*2*	0	*0*
Percentage of women among all new hires	47	*5*		

Table TYF.21	% of two-year colleges in fall 2010	SE
Colleges that require teaching evaluations for all full-time faculty	96	*3*
Colleges that require teaching evaluations for all part-time faculty	88	*5*

Table TYF.22	Percentage of programs using evaluation method for			
Method of evaluating teaching	Part-time faculty	SE	Full-time faculty	SE
A. Observation of classes by other faculty	69	*6*	64	*6*
B. Observation of classes by division head (if different from chair) or other administrator	42	*7*	55	*5*
C. Evaluation forms completed by students	97	*2*	98	*1*
D. Evaluation of written course material such as lesson plans, syllabus, or exams	53	*6*	58	*6*
E. Self-evaluation such as teaching portfolios	19	*4*	52	*6*
F. Written Peer Evaluations	11	*3*	27	*5*
G. Other methods	2	*1*	8	*3*

Table TYF.23

Faculty Development	Fall 2010	*SE*
Percentage of institutions requiring continuing education or professional development for full-time permanent faculty	67	*4*
How Faculty Meet Professional Development Requirements	% of permanent faculty in fall 2010	
A. Activities provided by employer	53	*5*
B. Activities provided by professional associations	34	*3*
C. Publishing books or research or expository papers	3	*1*
D. Continuing graduate education	4	*1*

Table TYF.24

Problem	% of program heads classifying problem as major 2010	*SE*
A. Maintaining vitality of faculty	4	*2*
B. Dual-enrollment courses	11	*4*
C. Staffing statistics courses	2	*1*
D. Students don't understand demands of college work	64	*4*
E. Need to use part-time faculty for too many courses	35	*4*
F. Faculty salaries too low	21	*3*
G. Class sizes too large	3	*1*
H. Low student motivation	50	*7*
I. Too many students needing remediation	67	*6*
J. Lack of student progress from developmental to advanced courses	37	*7*
K. Low success rate in transfer-level courses	13	*3*
L. Too few students who intend to transfer actually do	11	*2*
M. Inadequate travel funds for faculty	23	*5*
N. Inadequate classroom facilities for use of technology	10	*4*
O. Inadequate computer facilities for part-time faculty use	6	*2*
P. Inadequate computer facilities for student services	5	*2*
Q. Commercial outsourcing of instruction	0	-
R. Heavy classroom duties prevent personal & teaching enrichment by faculty	11	*3*
S. Coordinating mathematics courses with high schools	14	*3*
T. Lack of curricular flexibility because of transfer rules	5	*2*
U. Use of distance education	6	*2*

Table TYF.25	Percentage of program heads classifying problems as					
Problem	minor or no problem	*SE*	somewhat of a problem	*SE*	major problem	*SE*
A. Maintaining vitality of faculty	75	*6*	21	*6*	4	*2*
B. Dual-enrollment courses	61	*5*	16	*5*	11	*4*
C. Staffing statistics courses	71	*5*	13	*3*	2	*1*
D. Students don't understand demands of college work	7	*2*	28	*4*	64	*4*
E. Need to use part-time faculty for too many courses	35	*5*	28	*5*	35	*4*
F. Faculty salaries too low	49	*5*	30	*5*	21	*3*
G. Class sizes too large	80	*3*	17	*3*	3	*1*
H. Low student motivation	9	*3*	41	*6*	50	*7*
I. Too many students needing remediation	10	*4*	23	*5*	67	*6*
J. Lack of student progress from developmental to advanced courses	32	*6*	31	*6*	37	*7*
K. Low success rate in transfer-level courses	64	*5*	23	*4*	13	*3*
L. Too few students who intend to transfer actually do	66	*4*	23	*3*	11	*2*
M. Inadequate travel funds for faculty	53	*6*	23	*5*	23	*5*
N. Inadequate classroom facilities for use of technology	77	*5*	13	*3*	10	*4*
O. Inadequate computer facilities for part-time faculty use	79	*4*	15	*3*	6	*2*
P. Inadequate computer facilities for student services	83	*3*	12	*3*	5	*2*
Q. Commercial outsourcing of instruction	66	*5*	1	*1*	0	-
R. Heavy classroom duties prevent personal & teaching enrichment by faculty	58	*5*	31	*5*	11	*3*
S. Coordinating mathematics courses with high schools	47	*6*	39	*7*	14	*3*
T. Lack of curricular flexibility because of transfer rules	84	*5*	12	*4*	5	*2*
U. Use of distance education	68	*7*	15	*4*	6	*2*

Table TYF.26	% of Mathematics Programs	
Administrative structure	2010	*SE*
Mathematics Department	46	*5*
Mathematics and science department or division	14	*4*
Other department or division structure	31	*6*
None of the above or unknown	9	*4*