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

Fall 2000 CBMS Survey

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David Lutzer
James Maxwell
Stephen Rodi

Foreword

Every five years since 1965, the Conference Board of the Mathematical Sciences (CBMS) has sponsored a national survey of undergraduate mathematical sciences in the United States. With National Science Foundation (NSF) support, the eighth CBMS survey was conducted in the fall term of 2000, using a stratified random sample of the roughly 2,500 programs and departments of mathematics and statistics in two and four-year colleges and universities in the nation. This report presents the findings of the fall 2000 survey, hereafter called CBMS2000.

Like its predecessors since 1965, the CBMS2000 survey collected data on enrollment, curriculum, bachelors degrees granted, course availability, and faculty demographics. Furthermore, following the pattern of recent CBMS reports, the CBMS2000 survey collected detailed information about first-year courses in calculus and statistics. In addition, the CBMS2000 Steering Committee decided to include a list of special one-time topics thought by various professional society committees to be particularly timely. These were: the continuing impact of the calculus-reform movement; the mathematical education of pre-service K-8 teachers; special academic support programs available to undergraduates, including placement testing; the use of distance learning to teach mathematics and statistics; dual enrollment, a relatively new way for high school students to receive college credit for courses taken in high school; and the educational background of faculty members teaching statistics courses in fall 2000.

Chapters 1 and 2 of this report summarize the findings of CBMS2000 and, to a greater degree than ever before in CBMS survey reports, integrate and interrelate data on two-year and four-year programs. Chapters 3, 4, and 5 continue longitudinal studies of four-year colleges and universities, presenting data in finer detail than was possible in the first two chapters. Data in those three chapters provide separate profiles of the undergraduate mathematical sciences in the nation's bachelors, masters, and doctoral departments, and also compare educational practice and faculty demographics in the nation's mathematics and statistics departments. Chapter 5 focuses on educational practices in first year courses in calculus and statistics. Chapter 6 describes educational practices in the nation's two-year college mathematics programs, while Chapter 7 studies personnel and administrative issues in those programs.

The CBMS2000 survey differs from its predecessors in significant methodological ways. Previous studies sampled two separate universes, namely two-year colleges and four-year colleges and universities. The CBMS2000 survey sampled from three disjoint populations in the United States: two-year college mathematics programs (about 1,000 programs); four-year college and university mathematics departments (about 1,430 bachelors, masters, and doctoral departments); and four-year college and university statistics departments (about 70 bachelors, masters, and doctoral departments). The response rates were 60% for two-year college mathematics programs, 70% for four-year college and university mathematics departments, and 78% for statistics departments in four-year colleges and universities. Details appear in Appendix II.

Separate computer science departments were not included in the CBMS2000 survey, following the pattern established in CBMS1995. However, because many mathematics departments also teach computer science courses, enrollment tables and bachelors degree tables include data on computer science as offered by mathematics programs and departments. Data on computer science enrollments in separate doctoral computer science departments may be found in the annual "Taulbee" surveys published by the Computing Research Association [TaulbeeReport].

To put CBMS2000 data in context, this report contains substantial data from its predecessors in 1995 [CBMS1995] and 1990 [CBMS1990] and makes occasional reference to departmental guidelines published by the Mathematical Association of America [MAAGuidelines]. In several places, this report corrects typographical errors in those earlier reports, and in such cases the corrections are indicated in footnotes.

Chapter 1

Summary of CBMS2000 Findings on Mathematical Sciences Enrollment, Bachelors Degrees, Faculty, and the Curriculum in Two- and Four-Year Colleges and Universities

A. What Do the CBMS Surveys Study?

Every CBMS survey continues longitudinal studies of fall term undergraduate enrollments in the mathematics programs of two-year colleges and in the mathematics and statistics departments of four-year colleges and universities. Every CBMS survey includes departments that offer associate, bachelors, masters, and doctoral degrees. Every CBMS survey also studies the demographics of the faculty in those programs and departments and examines the undergraduate curriculum to determine what is taught, who teaches it, and how it is taught. In addition, each CBMS survey selects a family of special topics for study.

Chapter 1 of this report, and particularly the data highlights section of Chapter 1, gives an executive summary of CBMS2000 findings on the various longitudinal issues studied since 1965, presented at a broad level of aggregation. Individual tables are discussed in more detail after the data highlights section. Chapter 2 presents CBMS2000 findings on the special topics chosen for the fall 2000 study. Subsequent chapters disaggregate Chapter 1 material. For example, Chapter 3 examines enrollment and curricular variations among four-year mathematics and statistics departments that offer bachelors, masters, or doctoral degrees as their highest degrees, and Chapter 5 contains data on individual first-year courses. Chapter 4 presents four-year faculty demographic data broken down by department type. Chapters 6 and 7 present detailed studies of curricular and personnel issues in two-year college mathematics programs.

As used in CBMS surveys, the phrase "mathematics department" is very broad and includes departments with names such as Applied Mathematics, Mathematics and Statistics, Mathematics and Computer Science, and Mathematical Sciences, as well as Mathematics. In almost all of these departments, one finds courses in mathematics and in statistics, and in some one also finds courses in operations research and computer science. In two-year colleges, the mathematics program usually offers courses in mathematics and statistics, and sometimes includes computer science courses as well. All of these course enrollments are counted as mathematical sciences enrollments and are included in the CBMS surveys, provided they are taught in a mathematics program or department. Statistics departments are included in the CBMS2000 study in separate strata, and enrollment data from statistics departments include only statistics courses. Courses taught in separate departments such as operations research, computer science, biostatistics, or developmental studies are not included in CBMS studies after 1990.

As explained in Appendix 2, the CBMS2000 survey used separate stratified random samples of three separate universes: mathematics programs in not-for-profit two-year colleges, mathematics departments in four-year colleges and universities, and statistics departments in four-year colleges and universities. Response rates were 60% for two-year college mathematics programs, 70% for four-year college mathematics departments, and 78% for statistics departments. Data collected was then used to make national projections for the entire population.

B. Fall Mathematical Sciences Enrollments Return to 1990 Level (SE.1 & SE.2)

Data from the National Center for Educational Statistics (NCES) show that between fall 1990 and fall 2000, the combined total undergraduate enrollment in the nation's two-year and four-year colleges and universities grew by about 9.4%. By contrast, the combined fall 2000 mathematical sciences enrollment in the nation's two-year college mathematics programs and in the mathematics and statistics departments of four-year colleges and universities was essentially unchanged from the level of fall 1990. (However, Section C below shows that academic year enrollment totals may have changed substantially.)

Fall term mathematics program enrollments in two-year colleges grew by about 7.5% between fall 1990 and fall 1995, reaching a high point of 1,498,000 in fall 1995. Between fall 1995 and fall 2000, mathematics program enrollments dropped back to just below their level in fall 1990. During the same ten-year period, NCES data show that overall two-year college enrollments grew by about 4.8% between fall 1990 and fall 1995, and by another 6.4% between fall

1995 and fall 2000, for a total growth of about 11.5% during the 1990–2000 decade. (See Tables SE.1 and TYR.4 for details.)

In four-year colleges and universities, the ten-year mathematical sciences enrollment trajectory was quite different. Combined mathematics and statistics department fall enrollments dropped by about 10% during the first five years of the decade and rebounded by about 11.5% during the second, ending the decade at 1,984,000, less than 1% above the level of fall 1990. (However, academic year mathematical sciences enrollments dropped below 1990 levels; see Section C below.) At the same time, total undergraduate enrollments in four-year colleges and universities grew by three tenths of one percent between fall 1990 and fall 1995, and then by about 7.3% between fall 1995 and fall 2000, for a ten-year growth of just over 7.6%. (See Table SE.1.)

Of particular interest was the decade-long growth of statistics enrollments. Fall undergraduate enrollments in statistics departments exceeded 1990 levels by 68%. Enrollments in statistics courses in two-year colleges were 37% higher than in fall 1990, as were statistics course enrollments in four-year mathematics departments.

One way to understand the relationship between CBMS data and NCES data appearing in Table SE.1 is to calculate the number of mathematics enrollments per student enrollment in a given fall term. For combined mathematics and statistics enrollments in four-year colleges and universities, the ratio gives the number of fall term enrollments in mathematics and statistics departments per student enrolled in four-year colleges or universities The ratios for fall 1990, 1995, and 2000 were, respectively, 0.293, 0.264, and 0.274. For two-year college mathematics programs, the corresponding ratios were 0.266, 0.273, and 0.237. Separate ratios for mathematics, statistics and computer science courses may be calculated from Table E.2 in Chapter 3 and NCES totals in Table SE.1 of this chapter. (The ratios for fall 2000 may need revision when firm NCES data for fall 2000 total enrollments become available.)

Where are undergraduate mathematical sciences courses taught? Once again, fall 2000 resembled fall 1990. At the beginning of the decade, two-year college mathematics programs taught about 41% of the nation's undergraduate enrollments in the mathematical sciences. By fall 1995, that percentage had risen to 46%, and between fall 1995 and fall 2000, the percentage returned to the 41% level.

C. Academic Year Totals Unchanged Since 1995–1996 and Down From 1990–1991

In making staffing decisions, colleges and universities tend to use academic year total enrollment rather than fall term enrollment. Therefore, it is important to know how fall term enrollments can be used to predict academic year totals, and recent CBMS surveys have studied that question.

The CBMS surveys of fall 1990, 1995, and 2000 asked departments to give their total enrollment for the entire preceding academic year, and for the fall term of that year. Thus, for example, CBMS2000 asked for the total 1999–2000 academic year enrollments, and for the fall 1999 enrollment in departmental undergraduate courses.

The CBMS surveys in 1990 and 1995 found that total academic year enrollment in the nation's four-year undergraduate mathematical sciences departments was almost exactly twice the fall term enrollment. The CBMS1995 report (pp. 4–5) explained the finding as follows:

"The lesser Spring semester enrollment in those institutions with a two-semester calendar is precisely balanced by those institutions on the term or quarter calendar, where the fall enrollment is substantially less than half of the academic year enrollment. Thus, a good estimate of the 1995–1996 academic year enrollment is obtained by doubling the 1995 fall totals."

The CBMS2000 survey detected a major shift in the academic-year-to-fall-term ratio. Rather than being essentially 2 as in 1990 and 1995, the ratio of combined mathematics and statistics department enrollments in academic year 1999–2000 to enrollments in fall 1999 was about 1.85. With high confidence, the ratio for 1999–2000 was different from the "almost exactly two" ratio found by previous CBMS surveys. (See the discussion of Table SE.1.) This change may be due to a large-scale shift toward the use of semester systems rather than quarter systems that can be seen in Table SE.2 of this chapter. Whatever its cause, it has ramifications for comparisons of academic year mathematical sciences enrollments in 2000–2001 with the same enrollments in 1990–1991 and in 1995–1996.

For example, under the natural assumption that the academic-year-to-fall-term ratio for 2000–2001 was not much different from what it was in 1999–2000, one sees that although undergraduate enrollments in mathematics and statistics departments of four-year colleges and universities were essentially the same in fall 2000 as they were in fall 1990, the total mathematical sciences enrollments for the 2000–2001 academic year were probably 7% lower than in the 1990–1991 academic year. Similarly, even though fall term 2000 enrollments in all mathematics and statistics departments of four-year colleges and universities were 11.5% larger than fall 1995 totals, the combined mathematics and statistics department enrollment for the 2000–2001 academic year was only about 3% larger than in academic year 1995–1996.

For mathematics departments of four-year colleges and universities considered alone, the academic-year-to-fall-term ratio was about 1.84 during the

1999–2000 academic year. Once again assuming that the academic-year-to-fall-term ratio for 2000–2001 was not much different from its 1999–2000 value, we see that 2000–2001 academic year enrollments for mathematics departments considered separately were up by about 3% from the 1995–1996 academic year, and down by about 9% from the 1990–1991 academic year.

For both statistics departments and for mathematics programs of two-year colleges, the academic-year-to-fall-term ratios were above 2. For more details about the academic-year-to-fall-term ratio, see the discussion of Table SE.1 of this chapter.

D. The Fine Structure of Fall Enrollment Changes (SE.3 & SE.5)

The overall percentage changes seen in Table SE.1 mask shifts in the types of mathematical sciences courses taken by undergraduates, and these shifts are important tools in tracking the development of the mathematical sciences curriculum.

Between 1995 and 2000, the declines in the two-year college mathematics program fall term enrollments were sharpest in mathematics and computer science courses, while statistics course enrollments actually grew. In four-year colleges and universities, mathematics course enrollments rose by about 10% between fall 1995 and fall 2000, but not uniformly. Calculus and advanced level course enrollments were up by about 6% each, while introductory level enrollments (which include Liberal Arts Mathematics as well as pre-calculus courses) were up by about 18%. Remedial level enrollments declined between 1995 and 2000, just as they had between 1990 and 1995. Fall term computer science enrollments in the mathematics departments of four-year colleges and universities rebounded from 1995 lows, but by fall 2000 had only reached 68% of their 1990 level.

Starting in 1990, statistics course fall term enrollments had a decade-long rise in two-year college mathematics programs, and in fall 2000 they were 37% higher than in fall 1990. In mathematics departments of four-year colleges and universities, total statistics enrollments were 37% higher than in fall 1990 and in statistics departments they climbed to 68% above their fall 1990 level.

Fall enrollment in the principal first-year Elementary Statistics course (having no calculus prerequisite) grew substantially between 1995 and 2000, as can be seen from the figures in Appendix I. The increase in mathematics departments was about 20% and the course enrolled about 115,000 students in fall 2000, roughly 60% as many students as enrolled in mainstream Calculus I. (See Appendix I and note that the figures in Table SE.3 for elementary-level statistics enrollments combine enrollments in several elementary courses.) Enrollment in the same Elementary Statistics course taught in statistics departments grew by about 14% between fall 1995 and fall 2000, reaching a total enrollment of about 40,000 students. Combined enrollments in the elementary statistics courses of two-year college mathematics programs stood at about 74,000 students in fall 2000, an increase of about 3% over the level of fall 1995.

Of special interest for predicting future advanced mathematics and statistics enrollment is the enrollment level in mainstream calculus courses, i.e., calculus courses that are prerequisites for upper division mathematics, statistics, and science courses. In four-year colleges and universities, fall enrollments in mainstream Calculus I declined by about 1% between 1995 and 2000. By contrast, fall enrollments in mainstream Calculus II rose by about 5%, and fall enrollments in later calculus courses increased by a surprising 18% during that five-year period (see Appendix I). In two-year colleges, enrollment in mainstream Calculus I declined by almost 9% from fall 1995 levels and stood at 53,000 in fall 2000. There were similar declines in mainstream Calculus II and III enrollments (see Table TYR.3 in Chapter 6).

Enrollments in various mathematics courses provide one way to study the nation's undergraduate mathematics curriculum. Another approach to such a study is to determine the percentage of departments that offer certain upper division courses in a given year, and Table SE.5 presents that data. Except in Number Theory, all course availability percentages in SE.5 were down from 1995 levels. Comparing Table SE.5 of this report to 1995 data suggests a growing disparity between the kind of mathematics major offered in departments with graduate programs and in departments that offer only bachelors degrees, at least in terms of the availability within a given academic year of pure mathematics courses such as Real Analysis, Geometry, and Topology.

E. Bachelors Degrees Awarded (SE.4)

CBMS surveys collect data on the number of bachelors degrees awarded during the previous twelve months (July 1 to June 30). The number of bachelors degrees awarded through the nation's mathematics and statistics departments continued its decade-long decline, dropping by about 1.2% between 1994–1995 and 1999–2000, and in 1999–2000 stood at about 92.5% of the level ten years before. But not all types of mathematical sciences bachelors degrees declined. For example, the number of mathematics education degrees rose by 55% between 1990 and 1995, and then by another 3% between 1995 and 2000. Between 1995 and 2000 there was a noticeable increase in the number of computer science degrees and the number of joint degrees in mathematics and computer science awarded through mathematics departments. In addition, the number of "other undergraduate degrees" awarded through mathematics departments rose sharply, but the precise nature of these other mathematics degrees is unknown.

The percentage of women among all recipients of bachelors degrees awarded through mathematics and statistics departments rose to almost 43.5%, the highest percentage in the decade. Table E.1 in Chapter 3 provides details about components of that overall percentage, e.g., the percentage of women among recipients of degrees from statistics departments, and the percentage of women among mathematics education bachelors recipients.

F. Faculty Size — A Shift to Temporary Faculty (SF.6)

In two-year colleges, full-time faculty members are divided into those on the permanent staffing chart and those who are temporary. The size of the full-time mathematics program faculty grew by 2% between fall 1995 and fall 2000 even though mathematics program enrollments decreased during the same period. But there was a shift from permanent to temporary faculty: the number of permanent full-time faculty in two-year mathematics programs decreased by about 8% while the number of temporary full-time faculty increased almost six-fold.

Recent CBMS surveys have divided full-time faculty in four-year colleges and universities into tenured, tenure-eligible, and other full-time faculty. The latter category includes visitors, post-docs, and non-tenure-track instructors, for example. In four-year mathematics departments, between 1995 and 2000 the size of the total full-time and part-time faculty more or less kept pace with the growth of undergraduate fall enrollments (and probably outpaced the growth in academic year enrollments). As Table SF.6 shows, the size of the full-time faculty (including tenured, tenure-eligible, and other full-time) grew by about 4%. However, as Table F.2 of Chapter 5 shows, the composition of the national mathematics faculty changed markedly. The number of tenured faculty declined by about 3% between 1995 and 2000, and the number of tenure-eligible faculty declined by 6%. At the same time, the number of other full-time faculty increased by 65% and the number of part-time faculty rose by 35%. Clearly, a shift toward temporary faculty occurred in the mathematics departments of four-year colleges and universities.

As Table F.3 in Chapter 4 shows, a more serious situation developed in statistics departments. Between 1995 and 2000, the number of full-time faculty grew by 3% and the number of part-time faculty dropped by a third, so that the size of the faculty did not keep pace with the 14% fall enrollment increase between 1995 and 2000 (and certainly not with the even larger academic year enrollment increase in statistics departments). The 3% growth in the number of full-time faculty hid a 3% decline in the number of tenured statistics faculty and a 16% decline in the number of tenure-eligible statistics faculty, coupled with a more than doubling of the number of other full-time faculty. As in mathematics departments, there was a definite shift toward temporary faculty in statistics departments.

G. Gender and Ethnicity of the Mathematical Sciences Faculty (SF.8–SF.12)

In fall 2000, about 49% of permanent full-time faculty in two-year college mathematics programs were women, up nine percentage points between fall 1995 and fall 2000. Although precise comparison with 1995 results is not possible, it appears that the percentage of women among younger permanent faculty in two-year college mathematics programs dropped below the percentage of women among all permanent full-time faculty for the first time in ten years.

The percentage of women among the full-time faculty of mathematics departments in four-year colleges and universities rose continuously between 1980 and 2000 and reached 24.6% in fall 2000. That figure is approximately the same as the percentage of women (24.8%) among mathematics doctoral recipients during the five years between 1995 and 2000 found in Table SF.8 of this chapter. Among tenured mathematics department faculty, in fall 2000 the percentage of women stood at about 17%. The percentage of women among tenure-eligible faculty was 31%, down three percentage points from 1995 levels.

The percentage of women in statistics departments was considerably lower than in mathematics departments, standing at 18% in fall 2000. However, that percentage was up by seven percentage points between 1995 and 2000. In fall 2000, about 34% of tenure-eligible statistics faculty members were women.

Two-year college mathematics programs saw only marginal changes in the ethnic and racial composition of their permanent full-time faculty between fall 1995 and fall 2000, as Table TYR.27 in Chapter 7 shows. However, among faculty less than 40 years old, there was a slight decrease in the percentage of full-time permanent faculty who were white and non-Hispanic, but the comparison is complicated by a corresponding increase in the percentage of faculty whose race and ethnicity were unknown.

The CBMS2000 survey found some changes in the racial and ethnic composition of the full-time mathematical sciences faculty in four-year colleges and universities during the preceding five years. There were two point increases in the percentage of Asians and Hispanics in mathematics departments of four-year colleges and universities, and a six point decline in the percentage of white males, coupled with a three point increase in the percentage of white females. In statistics departments, the percentage of Hispanics dropped markedly, and the percentage of white males among the full-time statistics faculty dropped by three points, while the percentage of white women grew from 8% to 13%.

H. Who Teaches Mathematical Science Courses? (SF.17, SFY.18, and SFY.19)

Following the pattern of CBMS1995, the CBMS2000 survey investigated the percentage of enrollment in various types of courses taught by tenured or tenure-eligible faculty, other full-time faculty, part-time faculty, and graduate teaching assistants. Also following the pattern of earlier CBMS reports, CBMS2000 made the assumption that all upper-level courses were taught by tenured and tenure-eligible faculty. As explained in the discussion of Table SF.17, the existence of an unknown instructor column in CBMS2000 data makes comparisons with CBMS1995 more difficult, but some conclusions are clear, and are consistent with the shift toward temporary faculty reported above.

In mathematics departments of four-year colleges and universities, there was an increase in the percentage of enrollments taught by part-time faculty and by other full-time faculty (i.e., those full-time faculty who are not tenured and not tenure-eligible). There was a substantial decrease in the percentage of enrollment taught by tenured and tenure-eligible faculty, and it is likely that there was also a drop in the percentage of enrollment taught by graduate students. The same pattern existed in statistics departments. In mathematics programs of two-year colleges, the percentage of sections (not of enrollments) taught by full-time faculty members decreased, with a corresponding increase in the percentage of sections taught by part-time faculty.

The mainstream calculus courses are of particular interest to four-year departments because of their gateway role for mathematics, statistics, and science majors. Even in these crucial courses, between fall 1995 and fall 2000 the percentage of enrollment taught by tenured and tenure-eligible faculty decreased. In addition, the percentage of enrollment in mainstream calculus taught by graduate teaching assistants remained essentially at 1995 levels. By contrast, in two-year colleges, 85% of mainstream Calculus I sections were taught by full-time faculty in fall 2000.

In mathematics departments of four-year colleges and universities, the percentage of enrollment in the Elementary Statistics course (no calculus prerequisite) taught by tenured and tenure-eligible faculty declined by between ten and twenty percentage points from 1995 levels, while in statistics departments the decline was between five and eleven percentage points. In fall 2000, at least 45% of elementary statistics course enrollments in mathematics departments were taught by tenured and tenure-eligible faculty, while in statistics departments the percentage was perhaps ten points lower.

Mathematics programs of two-year colleges also saw a shift toward teaching by temporary faculty. The percentage of sections taught by part-time faculty rose five percentage points to 46% in fall 2000. In addition, among full-time faculty in two-year college mathematics programs, there was an 8% decline in the number of permanent full-time faculty, coupled with a six-fold increase in temporary full-time faculty (see Table TYR.24).

I. The Spread of Calculus Reform Among First-Year Courses (SFY.20–SFY.25)

Tracking the spread of the calculus reform movement has become more difficult now that almost every textbook publisher advertises almost all calculus books as reflecting the best of calculus reform ideas. However, one can still study the spread of new pedagogies advocated by the reform movement. Five reform pedagogies were studied by CBMS2000: the use of graphing calculators, writing assignments, computer assignments, group projects, and meeting at least once per week in a context that required student computer use.

In fall 2000, two-year college mathematics programs were far more likely to use the first four of those reform pedagogies in teaching calculus than were four-year college and university mathematics departments. Among four-year mathematics departments, graphing calculators and computer assignments were very widely used in fall 2000, but in those same departments the use of writing assignments and group projects did not grow much between fall 1995 and fall 2000, and in some situations actually declined.

Calculus reform influenced the teaching of courses other than calculus. CBMS2000 examined the use of the same five reform pedagogies in the teaching of the first-year Elementary Statistics course (no calculus prerequisite). The CBMS1995 report gives data on the use of computer assignments in the Elementary Statistics course in fall 1995. CBMS2000 data show that by fall 2000, the use of computer assignments in the Elementary Statistics course declined in mathematics departments of four-year colleges and universities, remained unchanged in the mathematics programs of two-year colleges, and increased slightly from 1995 levels in statistics departments. No historical data exist on the use of the other four reform pedagogies in the Elementary Statistics course. However, CBMS2000 data allow comparisons between pedagogical practices in mathematics departments, mathematics programs, and statistics departments. The data show that faculty members in statistics departments were considerably more interested in using computer assignments and in weekly meetings where students use computers than were their colleagues in mathematics departments or programs. On the other hand, mathematics departments tended to use writing assignments to a greater degree.

TABLES SE.1 and SE.2: ENROLLMENTS IN TWO-YEAR AND FOUR-YEAR MATHEMATICS AND STATISTICS PROGRAMS AND DEPARTMENTS

A. Overall Fall Undergraduate Enrollments Return to 1990 Levels

By fall 2000, combined enrollments in mathematics and statistics departments and mathematics programs in two- and four-year colleges and universities had rebounded from their 1995 low and ended the decade essentially where they started it. Viewed separately, both the mathematics programs in two-year colleges and the mathematics and statistics departments in four-year colleges and universities returned to 1990 enrollment levels by fall 2000, but by very different ten-year paths.

Two-year college mathematics program enrollment began the decade at 1,393,000 in fall 1990, rose by about 8% by fall 1995, and then declined. By fall 2000, mathematics program enrollment in two-year colleges was about one-half of one percent below its 1990 level. By contrast, fall enrollments in the mathematics and statistics departments of all four-year colleges and universities (i.e., including departments that give bachelors degrees as well as possibly higher degrees) began at 1,970,000 in fall 1990 and then declined by about 10% between 1990 and 1995. CBMS2000 found an increase from 1995 levels, and the estimated combined fall term enrollment in mathematics and statistics departments of all four-year schools was about seven-tenths of one percent higher than the fall 1990 level. (These enrollment figures include computer science courses provided they were taught by a mathematics or statistics department or program.)

In 1990, two-year college mathematics programs taught about 41% of all mathematical sciences enrollments in the U.S. By 1995, that percentage had risen to 46%, and between 1995 and 2000 the percentage returned to the 41% level seen ten years before.

B. Comparison to NCES Total Enrollment Figures

Enrollment changes in mathematics programs of two-year colleges and in mathematics and statistics departments of four-year colleges and universities must be viewed in the context of overall undergraduate enrollments. The National Center for Educational Statistics (NCES) is a federal agency that collects and publishes national educational statistics for the fall term of each academic year, and the bottom half of Table SE.1 presents NCES data taken from Table 5-1 of the NCES report *Condition of Education 2001* that can be located at the Internet address http://nces.ed.gov/programs/coe/2001/section1/tables/t05_1.html.

The NCES figures show that between 1990 and 1995 there was a 4.8% increase in two-year college fall enrollments, and at the same time CBMS1995 figures show that there was a 7.5% increase in enrollments in the mathematics programs of two-year colleges. Between fall 1995 and fall 2000, NCES projects that there was a 6.4% increase in total two-year college enrollments, while CBMS data show a decline of almost 7.5% in mathematics program enrollments.

In four-year colleges and universities, NCES data show an increase in fall undergraduate enrollments that was slightly less than three-tenths of one percent between fall 1990 and fall 1995. During that same period, CBMS data show a drop of almost 10% in mathematics and statistics department enrollments. Between fall 1995 and fall 2000, NCES projects an increase of 7.3% in total four-year college and university undergraduate enrollments, while CBMS data show an increase of about 11.5% in mathematics and statistics department enrollments.

Clearly, in both two-year colleges and in four-year colleges and universities, something other than the general enrollment level was driving enrollment changes in the mathematical sciences during the decade of the 1990s.

C. Separate Enrollment Trends in Undergraduate Mathematics, Statistics, and Computer Science Courses

Table SE.1 allows us to study undergraduate mathematics, statistics, and computer science enrollments separately. Recall that CBMS2000 considered only those computer science enrollments taught in mathematics programs of two-year colleges and in mathematics and statistics departments of four-year colleges and universities.

In two-year colleges, fall term mathematics course enrollments reached a high point in 1995 and fell by about 8% in the following five years. In fall 2000, they stood about 3% above the levels of 1990. Fall mathematics enrollments in four-year colleges and universities rose from their 1995 lows and in fall 2000 were 99.6% of their fall 1990 levels.

The CBMS surveys in 1990, 1995, and 2000 found growth in statistics enrollments in each five-year period and in each type of program or department surveyed. In two-year colleges, fall term statistics enrollments rose at a much slower pace between 1995 and 2000 than between 1990 and 1995, and by fall 2000 stood about 37% above their levels in 1990. Combined fall enrollments in statistics courses in the mathematics and statistics departments of four-year institutions grew steadily and in fall 2000 exceeded 1990 levels by about 45%. As Table E.2 in Chapter

3 shows, fall statistics enrollments in the nation's mathematics departments rose by almost 20% between 1995 and 2000, and statistics enrollments in statistics departments rose by about 14% during that same five-year period.

As noted above, recent CBMS surveys include certain computer science enrollments. The computer science enrollments in two-year colleges given in Table SE.1 are somewhat difficult to interpret. The estimates for 1990 (and before) include all computer science courses, whether or not they were taught within the mathematics program, but starting in 1995 only those computer science enrollments taught in the mathematics program were counted. That may be a partial explanation for the substantial computer science enrollment decrease between 1990 and 1995. Computer science enrollments in two-year college mathematics programs dropped even further between 1995 and 2000. This was probably due to the continued migration of computer science courses into their own programs, separate from the mathematics programs in two-year colleges.

Between 1990 and 1995, fall term computer science enrollments in four-year college and university mathematics departments dropped by about 45%. Between fall 1995 and fall 2000, there was a 24% increase, but computer science enrollments in mathematics departments remained more than 30% below the levels of fall 1990. The vast majority of these enrollments were in masters and bachelors schools.

TABLE SE.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: Fall 1980, 1985, 1990, 1995, and 2000.

	Four-Year College & University Mathematics & Statistics Departments							Two-Year College Mathematics Programs				
	Fall					2000 by Dept		Fall				
	1980	1985	1990	1995	2000	Math	Stat	1980	1985	1990	1995	2000
Mathematics	1525	1619	1621[1]	1471[1]	1614	1614	--	925	900	1241	1384	1273
Statistics	147	208	169	208	245	171	74	28	36	54	72	74
Computer Science	na	na	180	100	124	123	1	95[3]	98[3]	98[3]	43[3]	39[3]
Total	1672[2]	1827[2]	1970	1779	1984	1909	75	1048	1034	1393	1498	1386
NCES Total Fall Enrollment 2-yr								4526	4531	5240	5493	5847[4]
NCES Total Fall Enrollment 4-yr	5949	6066	6719	6739	7232[4]							
NCES Total Fall Enrollment 2-yr + 4-yr	10475	10597	11959	12232	13079[4]							

[1] These totals include approximately 2000 mathematics enrollments taught in Statistics Departments.
[2] 1980 and 1985 totals do not include Computer Science enrollments in Mathematics Departments.
[3] Computer Science totals in two-year colleges before 1995 include estimates of CS courses taught outside of the Mathematics Program. Starting with 1995, only those CS courses taught in the Mathematics Program are included.
[4] NCES Fall enrollment figures for Fall 2000 are projections "based on data through 1997 and middle alternative assumptions concerning the economy." Source: "Condition of Education 2001" report, Participation in Education Table 5-1 located at http://nces.ed.gov/programs/coe/2001/section1/tables/t05_1.html.

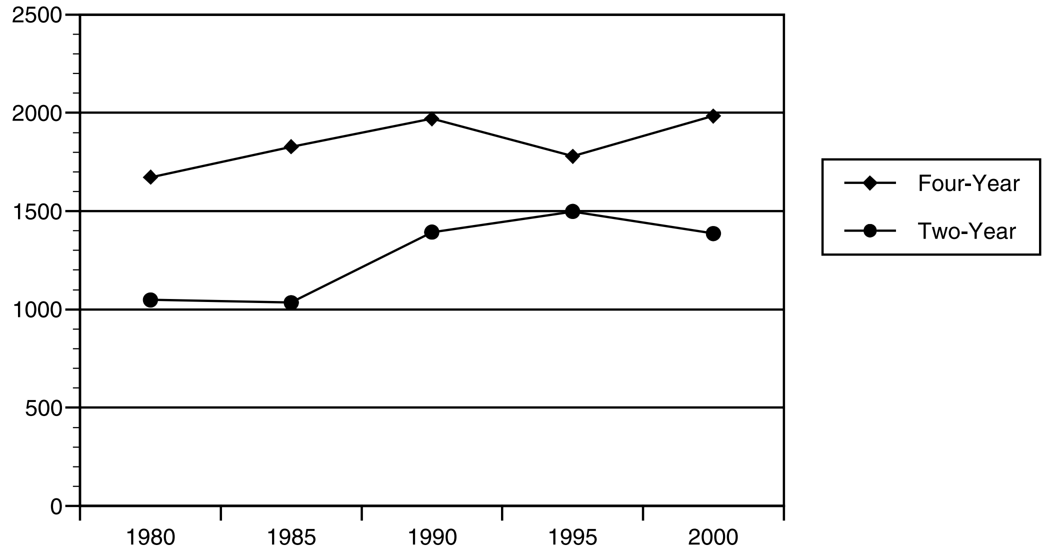

FIGURE SE.1.1 Combined enrollment (in 1000s) in undergraduate Mathematics, Statistics, and Computer Science courses at four-year colleges and universities in Mathematics Departments and Statistics Departments, and in Mathematics Programs of two-year colleges: Fall 1980[1], 1985[1], 1990, 1995[2], and 2000[2].

[1] 1980 and 1985 totals do not include Computer Science enrollments in Mathematics and Statistics Departments.
[2] Before 1995, two-year enrollments include Computer Science enrollments taught outside of the Mathematics Program.

D. Estimating Academic Year Enrollment Figures From Fall Enrollments

Since 1965, the CBMS surveys have studied enrollments in the fall term, thereby following the NCES pattern. Using fall figures to estimate total annual enrollments is tricky, because for some schools, fall semester is half of the academic year, while for others fall term is one third of the year.

Consequently, the 1990 and 1995 CBMS surveys included summary questions concerning total enrollments in all terms of the preceding academic year, in an effort to determine how to estimate total academic year enrollments from fall enrollments. In both 1990 and 1995, the surveys found that total undergraduate mathematical sciences enrollment in four-year colleges and universities (i.e., the combined enrollment in mathematics and statistics departments) for the entire academic year was almost exactly twice the total fall term enrollment.

The CBMS2000 survey repeated the study of annual v. fall term enrollments, asking about total mathematical sciences enrollments in the fall term of 1999 and in the entire 1999–2000 academic year. It found a substantial change, estimating the ratio of academic-year to fall-term enrollments (AY/FT) for four-year mathematics and statistics departments combined to be 1.85 (with standard error SE = 0.03) rather than 2. We do not have SE values for the combined mathematics and statistics department AY/FT ratio in 1994–1995, but if we make the reasonable assumption that the 1994–1995 AY/FT ratio had about the same SE value as the 1999–2000 figure, then there is little doubt that a real change in the AY/FT ratio occurred during the last five years of the decade.

For mathematics departments considered separately, the 1999–2000 AY/FT ratio is estimated to be 1.84 with SE = 0.03. (The ratio was 1.81, 1.91, and 1.81 for doctoral, masters, and bachelors departments respectively.) Statistics departments seem to have quite a different enrollment pattern during the academic year. Their AY/FT ratio for the 1999–2000 academic year was 2.18 with SE = 0.05. The marked difference between the AY/FT ratios for four-year mathematics and statistics departments separately did not have much impact on the combined AY/FT ratio because four-year mathematics department enrollments were more than twenty times the size of statistics department enrollments.

No historical data exist on the AY/FT ratio for two-year college mathematics programs before CBMS2000. For future reference, the two-year college AY/FT ratio was 2.01 with SE = 0.04 in the 1999–2000 academic year.

Why was the AY/FT ratio almost exactly 2 in 1990 and 1995, and why did it change? The CBMS1995 report suggested that the AY/FT ratio was almost exactly 2 because second semester enrollment declines in semester system schools were almost exactly offset by the fact that in non-semester schools, the fall term had much less than half of the entire academic year enrollments. That explanation is consistent with the observed decrease in the AY/FT ratio found by CBMS2000 because Table SE.2 shows clearly that both two-year colleges and four-year colleges and universities moved steadily toward the use of a semester system between 1995 and 2000, with the result that we would expect the AY/FT ratio to decline.

The decreases in the AY/FT ratios have important ramifications for estimating academic year enrollments. Consider the combined mathematics and statistics department enrollments in four-year colleges and universities. In 1990 and 1995, that AY/FT ratio was almost exactly 2, and in 2000 the ratio was 1.85. Table SE.1 shows that the combined four-year mathematics and statistics department enrollment in fall 2000 was 11.5% higher than in fall 1995. If we make the reasonable assumption that the AY/FT ratio for 2000–2001 was very close to the ratio for 1999–2000, then the combined four-year mathematics and statistics department academic year enrollment in 2000–2001 probably was only 3% higher than the combined academic year enrollment in 1995–1996. Similarly, while Table SE.1 shows that combined four-year mathematics and statistics fall 2000 enrollments essentially returned to their fall 1990 level, the change in the AY/FT ratio means that the total academic year enrollments in 2000–2001 were actually about 7% lower than the total academic year enrollments in 1990–1991.

TABLE SE.2 Number and percentages of four-year and two-year schools with various types of academic calendars: Fall 1995 and 2000.

	Four-Year Colleges & Universities				Two-Year Colleges			
Type of calendar	Fall 1995		Fall 2000		Fall 1995		Fall 2000	
Semester	1072	(77%)	1329	(89%)	747	(73%)	981	(93%)
4-1-4	184	(13%)	75	(5%)	0	(0%)	0	(0%)
Trimester	4	(0%)	21	(1%)	0	(0%)	2	(0%)
Quarter	109	(8%)	53	(4%)	266	(26%)	66	(6%)
Other	27	(2%)	12	(1%)	10	(1%)	4	(0%)
Total	**1396**	**(100%)**	**1490**	**(100%)**	**1023**	**(100%)**	**1053**	**(100%)**

TABLE SE.3: HISTORY OF FALL UNDERGRADUATE ENROLLMENTS

A. Notes on the Table

Table SE.3 presents longitudinal data on enrollments in mathematics departments and statistics departments in four-year colleges and universities, and in mathematics programs of two-year colleges. As noted above, the term “mathematics department” is used broadly, to include departments with names such as Mathematical Sciences, Applied Mathematics, Mathematics and Computer Science, or Mathematics and Statistics, as well as Mathematics. Statistics departments that are organizationally distinct from mathematics departments were surveyed as a separate universe, as were two-year college mathematics programs. Separate computer science departments were not included in the CBMS2000 survey.

Statistics courses and computer science courses are often taught in mathematics departments of four-year colleges and universities, particularly in colleges and universities that do not have separate departments in these subjects. As with the CBMS1995 survey, CBMS2000 included these courses and enrollments as part of the curriculum of the mathematics department in which they were offered. Table SE.3 separately describes courses in mathematics, statistics, and computer science taught in mathematics and statistics departments.

Table SE.3 divides courses into levels, following the pattern of previous CBMS surveys. Because the curriculum differs so much between, say, two-year college mathematics programs and four-year college mathematics departments, the level called “remedial” does not mean the same thing in both types of departments. For a listing of the course names in each level in each type of department, see Appendix I (for four-year mathematics and statistics departments) and see Table TYR.3 in Chapter 6 for a listing of courses and levels in two-year colleges. Alternatively, see the three separate questionnaires that are reproduced in Appendices IV, V, and VI of this report.

B. Mathematics Course Enrollments: Two-Year Colleges Down, Four-Year Colleges Up

Between 1995 and 2000, fall term mathematics course enrollments in two-year college mathematics programs decreased by about 8%. That decrease was far from uniform. Enrollments in calculus level courses in two-year colleges dropped by almost 18%, while enrollments in remedial level courses declined by less than 5%. The category called “Other two-year mathematics courses” — which is a potpourri of courses such as Linear Algebra, Mathematics for Liberal Arts, Business Mathematics, and Technical Mathematics (but not including statistics) — dropped by almost 19%. However, compared to 1990, total fall 2000 mathematics course enrollments in two-year colleges were about 3% above their level a decade before.

Fall term mathematics course enrollments in four-year mathematics departments grew by almost 10% from 1995 to 2000 and came very close to matching the levels reached in 1990. Once again, the enrollment changes varied from one course level to another. Remedial level enrollments actually declined slightly. Introductory level enrollments, which include Liberal Arts Mathematics as well as pre-calculus courses, increased by almost 18% from 1995 levels, while calculus level and advanced level enrollments rose by about 6% each. When compared to enrollments in fall 1990, all levels except the introductory level were down substantially in fall 2000, while introductory level enrollments were up by 22%.

The fine structure of the changes in introductory level and calculus level enrollments may be important to understand. What CBMS2000 calls “introductory level mathematics courses” were called “pre-calculus level” in previous CBMS surveys, although the courses belonging to this category have not changed much over time. As can be seen from the course-by-course data in Appendix I, in fall 2000 only about 53% of introductory level enrollments were in courses designed to prepare students for calculus (namely College Algebra, Trigonometry, Algebra and Trigonometry, and Elementary Functions) while in fall 1995 the corresponding figure was 60%. Enrollment in these truly pre-calculus courses rose by about 5% from 1995 levels. By contrast, enrollment in the rest of the introductory level courses (which include Liberal Arts Mathematics, Finite Mathematics, Business Mathematics, and Mathematics for Elementary School Teachers) grew by about 37% between 1995 and 2000.

Calculus level enrollments include sophomore level courses such as Differential Equations, Discrete Mathematics, and Linear Algebra as well as mainstream calculus (i.e., those calculus courses that can serve as prerequisites for upper level mathematics courses) and non-mainstream calculus (all other calculus courses). The roughly 6% growth in calculus level enrollments between 1995 and 2000 was composed of a roughly 4% increase in mainstream calculus enrollments, a 3% increase in non-mainstream calculus, and a 12% increase in the other calculus level courses. It is also interesting to note that fall term mainstream Calculus I enrollments were unchanged between fall 1995 and fall 2000, while fall term mainstream Calculus II enrollments were up by 5% and fall term mainstream Calculus III and IV enrollments rose by 18% over fall 1995 levels. The surprising increases in mainstream Calculus II, III, and IV and in courses such as Linear Algebra, Discrete Mathematics, and Differential Equations may predict increases in upper division mathematics and statistics enrollments after 2000.

C. Statistics Enrollments Rise

Statistics course enrollments rose between fall 1995 and fall 2000, and rose markedly since fall 1990 in every type of institution surveyed. Two-year colleges saw the smallest increase after 1995 — only about 3% — while the mathematics and statistics departments of four-year colleges and universities both saw double-digit increases in their statistics course enrollments. Compared to 1990, fall 2000 statistics course enrollments in two-year colleges and in mathematics departments of colleges and universities rose by 37%, while the increase in statistics departments was 68%. These increases in statistics department enrollments make it harder to understand the marked decline in

TABLE SE.3 Enrollment (in 1000s) 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: Fall 1980, 1985, 1990, 1995, and 2000.

	Fall enrollment (in 1000s)												
	Four-Year College & University								Two-Year College Mathematics Programs				
	Mathematics Departments					Statistics Departments							
Course level	1980	1985	1990	1995	2000	1990	1995	2000	1980	1985	1990	1995	2000
Mathematics courses													
Remedial	242	251	261	222	219	--	--	--	441	482	724	800	763
Introductory (incl. Precalc)	602	593	592	613	723	--	--	--	180	188	245	295	274
Calculus	590	637	647	538	570	--	--	--	86	97	128	129	106
Advanced	91	138	119	96	102	--	--	--	0	0	0	0	0
Other (2-year)									218	133	144	160	130
Total Math courses	**1525**	**1619**	**1619**	**1469**	**1614**	**--**	**--**	**--**	**925**	**900**	**1241**	**1384**	**1273**
Statistics courses													
Elementary	na	na	87	115	136	30	49	54	28	36	54	72	74
Upper level	na	na	38	28	35	14	16	20	0	0	0	0	0
Total Stat courses	**na**	**na**	**125**	**143**	**171**	**44**	**65**	**74**	**28**	**36**	**54**	**72**	**74**
CS courses													
Lower level	na	na	134	74	90	0	1	1	95	98	98	43[1]	39[1]
Middle level	na	na	12	13	17	0	0	0	0	0	0	0	0
Upper level	na	na	34	12	16	0	0	0	0	0	0	0	0
Total CS courses	**na**	**na**	**180**	**99**	**123**	**0**	**1**	**1**	**95**	**98**	**98**	**43**[1]	**39**[1]
Grand Total	**na**	**na**	**1924**	**1711**	**1908**	**44**[2]	**66**[2]	**75**	**1048**	**1034**	**1393**	**1499**	**1386**

[1] Computer Science enrollment in 1995 and 2000 includes only courses taught in Mathematics programs. For earlier years it also includes estimates of Computer Science taught outside of the Mathematics program.

[2] These totals were adjusted to remove certain mathematics enrollments included in Statistics totals in 1990 and 1995.

the number of statistics department faculty between 1995 and 2000, as shown in Table F.3 of Chapter 4.

D. Computer Science Enrollments

Fall term computer science enrollments in two-year college mathematics programs dropped over 9% between 1995 and 2000. Because CBMS1990 figures include computer science enrollments taught outside of the mathematics program as well as within it, while later enrollment figures include only those computer science courses taught in mathematics, it is not meaningful to compare two-year college computer science enrollment figures from fall 2000 with the figures from fall 1990.

Table SE.3 shows that there were about 123,000 enrollments in computer science courses taught in the mathematics departments of four-year colleges and universities. These enrollments were primarily in bachelors and masters level departments as Table E.10 in Chapter 3 shows. Fall 2000 computer science enrollment grew substantially from 1995 levels, but reached only 68% of 1990 levels.

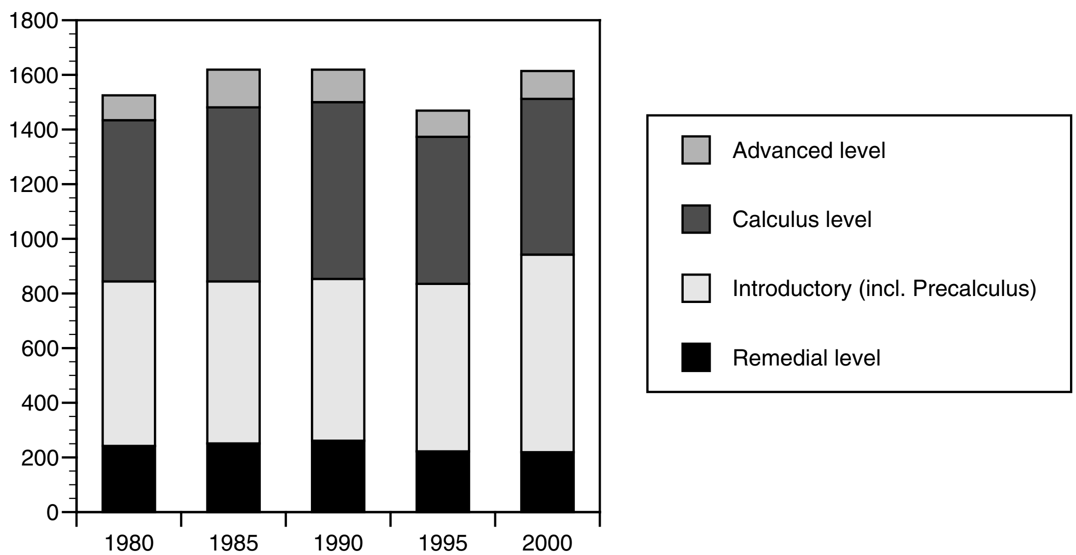

FIGURE SE.3.1 Enrollment (in 1000s) in undergraduate Mathematics courses in Mathematics Departments of four-year colleges and universities, by level of course: Fall 1980, 1985, 1990, 1995, and 2000.

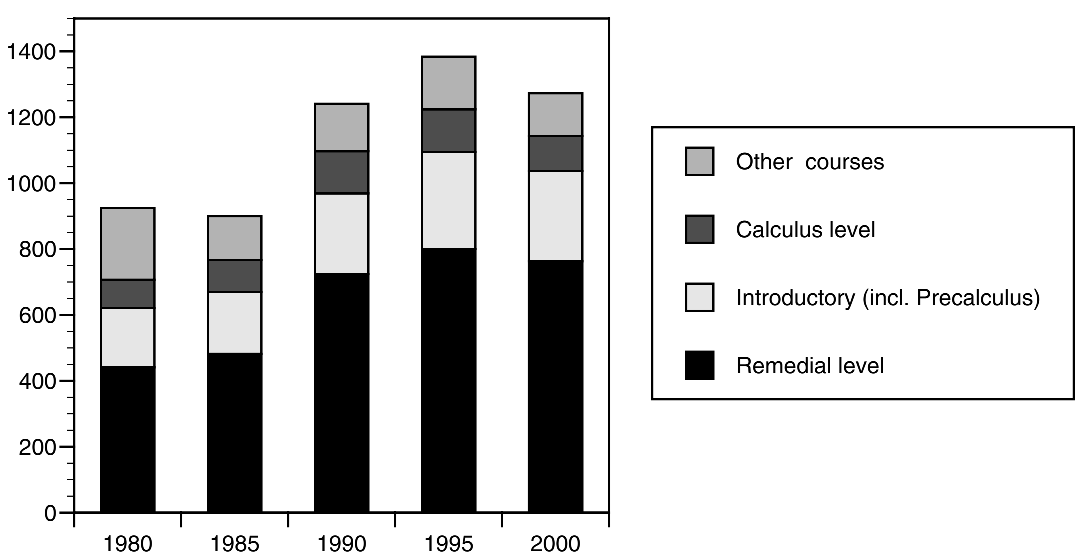

FIGURE SE.3.2 Enrollments (in 1000s) in Mathematics courses in two-year college Mathematics Programs by level of course: Fall 1980, 1985, 1990, 1995, and 2000.

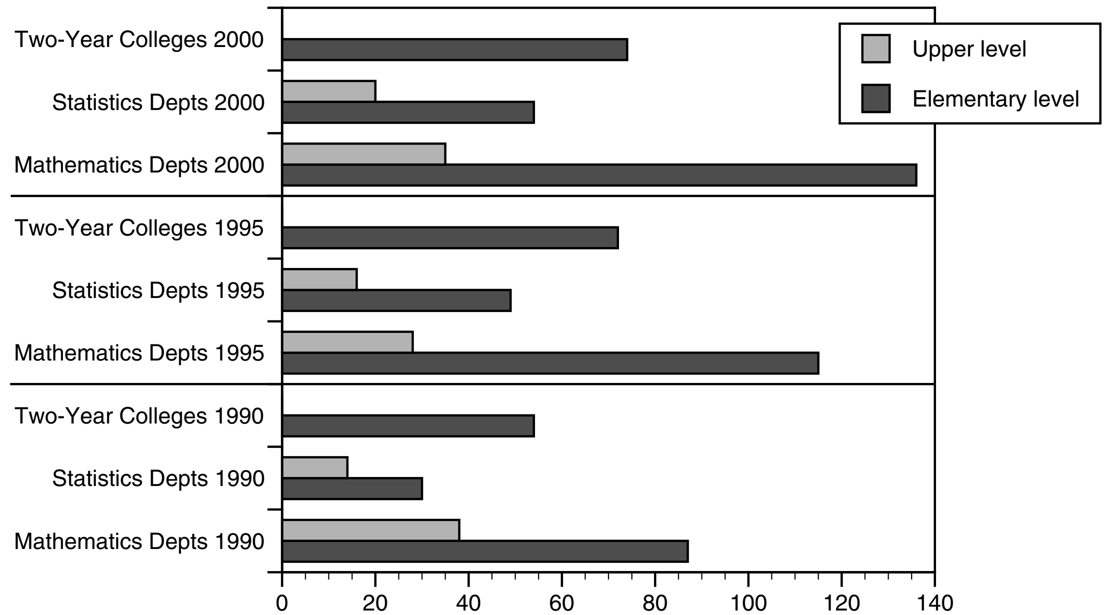

FIGURE SE.3.3 Enrollments (in 1000s) in Statistics courses in two year college Mathematics Programs, and in Mathematics Departments and Statistics Departments of four-year colleges and universities: Fall 1990, 1995, and 2000.

TABLE SE.4: BACHELORS DEGREES AWARDED

A. Trends in the Total Number of Bachelors Degrees Awarded

Following the pattern of previous CBMS surveys, the CBMS2000 survey asked about the number of bachelors degrees awarded by mathematics and statistics departments in colleges and universities during the preceding twelve months, in this case July 1, 1999 to June 30, 2000. The total number of bachelors degrees awarded by those departments continued its decline from the levels of 1989–1990, although the decline between 1994–1995 and 1999–2000 (about 1.2%) was smaller than the drop between 1989–1990 and 1994–1995 (over 6%). The overall number of bachelors degrees granted through mathematics and statistics departments in 1999–2000 stood at about 92.5% of its level ten years earlier.

The number of mathematics education degrees grew slightly from 1995 levels. The percentage of mathematics education degrees among all bachelors degrees granted by mathematics and statistics departments grew between 1990 and 2000, rising from about 13% of the total in 1989–1990 to 22% in 1999–2000. Almost all of that growth occurred during the first five years of the decade.

The number of bachelors degrees in computer science awarded through mathematics departments rose about 21% from its 1994–1995 level, but still remained substantially below the corresponding number awarded in 1989–1990.

Table SE.4 shows that between 1994–1995 and 1999–2000, there was a surprising increase in the number of mathematics bachelors degrees that departments classified as “Other tracks” in the department. It would be interesting to know details about these other degrees because in 1999–2000, almost 8% of all mathematics bachelors degrees belonged to that category.

B. Percentage of Degrees Awarded to Women

The percentage of women among all bachelors degree recipients in mathematics and statistics departments grew from 41.9% in 1994–1995 to 43.4% in 1999–2000, its highest level in the decade. Among recipients of computer science bachelors degrees awarded by mathematics departments, the percentage of women grew from about 19% in 1994–1995 to about 24% in 1999–2000. Comparing Table E.1 in Chapter 3 of this report with the corresponding table (in Chapter 2) in the 1995 report shows that the percentage of women among recipients of mathematics education bachelors degrees rose from 49% in 1994–1995 to 59% in 1999–2000.

TABLE SE.4 Number of bachelors degrees in Mathematics and Statistics Departments at four-year colleges and universities (combined) between July 1 and June 30 in 1979-80, 1984-85, 1989-90, 1994-95, and 1999-2000 by selected majors and by gender for totals in 1989-90, 1994-95, and 1999-2000.

Major	1979-80	1984-85	1989-90	1994-95	1999-2000
Mathematics (except as reported below)	11541	13171	13303	12456	10759
Mathematics Education	1752	2567	3116	4829	4991
Statistics (except Actuarial Science)	467	538	618	1031	502
Actuarial Mathematics & Statistics	146	na	245	620	425
Operations Research	na	312	220	75	43
Joint Mathematics & Computer Science	na	2519	960	453	876
Joint Mathematics & Statistics	na	121	124	188	196
Other	0	9	794	502	1507
Total Mathematics, Statistics & joint degrees	**13906**	**19237**	**19380**	**20154**	**19299**
Number of women	na	na	8847	9061	9017
Computer Science degrees	**na**	**8691**	**5075**	**2741**	**3315**
Number of women	na	na	1584	532	808
Total degrees	**na**	**27928**	**24455**	**22895**	**22614**
Number of women	**na**	**na**	**10431**	**9593**	**9825**

Note: For more detailed information about numbers of majors see Table E.1 in Chapter 3.

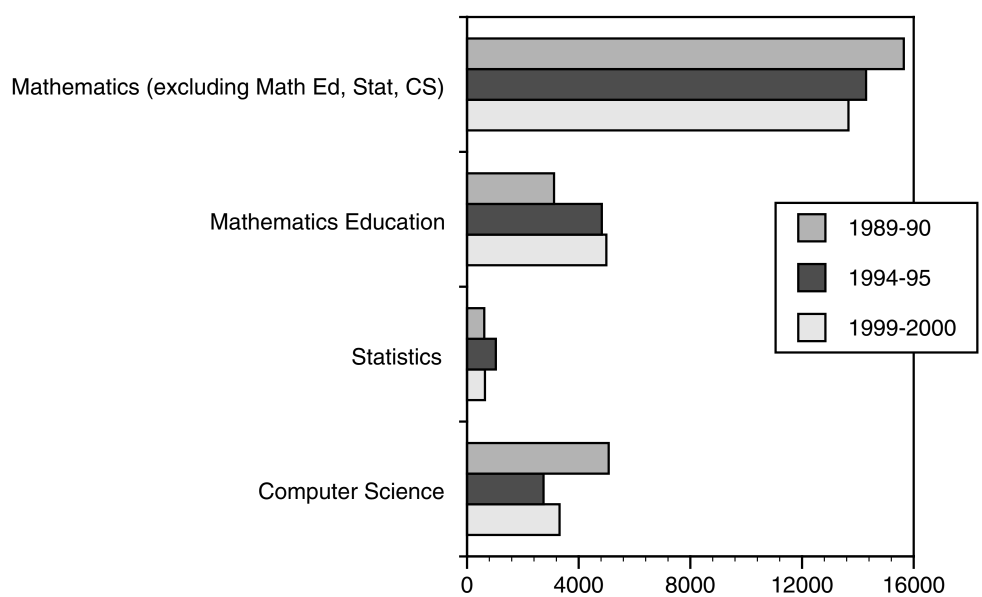

FIGURE SE.4.1 Number of bachelors degrees awarded by Mathematics Departments at four-year colleges and universities and by Statistics Departments at universities (combined) between July 1 and June 30 in 1989-90, 1994-95, and 1999-2000.

TABLE SE.5: AVAILABILITY OF ADVANCED COURSES

Table SE.5 shows the percentage of departments in four-year colleges and universities offering various advanced mathematics and statistics courses at least once in the 2000–2001 academic year. The percentage of departments offering a given course at least once in academic year 2000–2001 is one measure of the extent to which the course was a real part of the undergraduate mathematics or statistics major in the U.S. (Analysis of course availability in two-year colleges appears in Tables TYR.5 and TYR.6 in Chapter 6.)

The first two columns of Table SE.5 present overall course-availability percentages from 1995–1996 and 2000–2001. Comparison of 2000–2001 and 1995–1996 percentages provides one measure of how the actual curriculum for mathematics majors changed between 1995 and 2000. (Because no 1995 data exist on the statistics courses listed in Table SE.5, no such comparisons are possible for the statistics major.) With the exception of Number Theory, every mathematics course listed in Table SE.5 was less available in the 2000–2001 academic year than in 1995–1996. Modern Algebra courses were available at almost the same rate as they were five years earlier, while availability of Real Analysis and Geometry courses fell off noticeably. Why Analysis should decline so much more than Modern Algebra is not clear. Undergraduate Topology suffered the largest decline of all. It is somewhat surprising that Mathematics for Secondary Teachers also declined, given the continued rise in the number of mathematics education bachelors degrees awarded (see Table SE.4).

The third, fourth, and fifth columns of Table SE.5 show that during the 2000–2001 academic year, there was substantial variation in course availability based on the highest degree offered in a department. Undergraduates in doctoral departments had a wider array of undergraduate courses available to them than did the undergraduates in bachelors-only departments. But from the individual student's point of view, the difference might not have been as great as Table SE.5 suggests, given that students usually need two academic years to complete the upper division courses of their majors, and given that bachelors-only departments tend to offer some of their elective courses in alternate years.

Further information about the differences between mathematics majors in doctoral and bachelors departments comes from comparing Table SE.5 in the current report with SE.5 in the CBMS1995 report. Some of the shifts in course availability during the last five years of the 1990s were somewhat surprising. For example, in 1995–1996, undergraduate Topology was available in 63% of doctoral departments and in 52% of bachelors-only departments, while in 2000–2001 undergraduate Topology was available in 61% of doctoral departments and in 13% of bachelors-only departments. That was the most pronounced shift in relative course availability, but several other courses (e.g., Real Analysis, Geometry, and Combinatorics) experienced shifts in the same direction, albeit to a smaller degree. On the other hand, the availability of courses like Number Theory and Operations Research in bachelors-only departments became closer to the availability of those courses in doctoral departments. The relative availability of Modern Algebra did not change from 1995–1996 to 2000–2001; while the percentage of departments offering the course declined, the decline was about the same in doctoral and bachelors departments.

TABLE SE.5 Percentage of departments offering various undergraduate Mathematics and Statistics courses in 1995-96 and in 2000-01, by type of department in 2000-01.

		Academic Year 2000-01						
	All Math Depts 1995-96	All Math Depts 2000-01	PhD Math	MA Math	BA Math	All Stat Depts 2000-01	PhD Stat	MA Stat
Number of departments	1369	1430	187	233	1010	70	57	13
Upper level Mathematics								
Modern Algebra	77	71	87	88	63			
Adv Calculus/ Real Analysis	70	56	90	77	45			
Geometry	69	56	75	88	46			
Topology	50	22	61	32	13			
Number theory	27	33	63	57	23			
Combinatorics	24	18	48	24	11			
Applied Math/Modeling	35	24	51	51	13			
Intro to Operations Research	24	13	14	26	10			
Foundations/Logic	24	16	23	31	12			
Math for secondary teachers	53	42	39	64	37			
Math senior seminar/Ind study	77	58	57	62	58			
Upper level Statistics								
Mathematical Statistics	na	52	53	72	47	90	93	75
Probability	na	40	57	63	31	75	81	50
Stochastic processes	na	6	29	9	1	46	54	13
Applied statistical analysis	na	13	27	42	4	72	74	63
Experimental design	na	10	21	20	5	74	76	63
Regression & Correlation	na	9	22	24	3	82	86	63
Biostatistics	na	5	7	2	5	20	19	25
Nonparametric Statistics	na	4	14	7	1	45	43	50
Categorical data analysis	na	1	9	2	0	39	44	13
Sample survey design	na	3	10	11	0	52	50	63
Stat software & computing	na	5	21	13	1	48	45	63
Data management	na	1	4	2	0	13	16	0
Statistics senior sem/Ind study	na	5	15	14	2	34	36	25

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

TABLE SF.6: SIZE OF THE FACULTY

This table presents data on the size of the full-time faculty (consisting of tenured, tenure-eligible, and other full-time faculty) in the mathematics departments and statistics departments of four-year colleges and universities, and on the size of the permanent and temporary full-time faculty in mathematics programs at two-year colleges. For more detailed faculty information separated by type of appointment and by type of department (highest degree offered), see Tables F1, F2, and F3 in Chapter 4. For more details on the two-year college faculty, see Table TYR.17 in Chapter 7.

A. Mathematics Departments: A Shift to Temporary Staff

As Table SE.3 shows, total undergraduate enrollments in mathematics departments (including all mathematics, statistics, and computer science courses taught in the nation's mathematics departments) increased by about 11.5% from fall 1995 to fall 2000. It is hard to tell whether there was a corresponding growth in faculty in mathematics departments. Table SF.6 shows that the number of full-time faculty in mathematics departments grew by just over 4%, from 18,248 to 19,007, during that same period. However, that is not the total story, because as Table SF.13 shows, during the same time period there was a roughly 35% growth in part-time faculty in mathematics departments with the result that the number of all faculty, both full-time and part-time, appears to have grown by about 11%. But because part-time faculty do not always teach the same number of courses per person as full-time faculty members, it is impossible to know whether that 11% increase represents an 11% growth in the "teaching power" of mathematics departments. In addition, as Tables F1 and F2 in Chapter 4 show, the 4% growth in total full-time faculty masked a decline of about 3% in the number of tenured faculty and a decline of about 6% in the number of tenure-eligible faculty, coupled with an increase of 65% in the number of other full-time faculty (i.e., full-time faculty who are neither tenured nor tenure-eligible) in mathematics departments. It is fair to say that in the period from fall 1995 to fall 2000 total faculty growth may have kept pace with fall enrollment growth, but there was a substantial shift away from staffing with tenured and tenure-eligible faculty members in the nation's mathematics departments.

B. Statistics Departments: Faculty Numbers Fall Behind Enrollment and Shift to Temporary Staff

Table SE.3 also reveals that undergraduate enrollments in the nation's statistics departments rose by almost 14% between fall 1995 and fall 2000. During the same period, as Table SF.6 reveals, the total full-time faculty in statistics departments grew by about 3%, from 988 to 1022. But in the case of statistics departments, at the same time there was a 34% drop in the number of part-time faculty. Clearly, then, the growth in "teaching power" of the nation's statistics departments did not come close to keeping pace with the growth in fall enrollment. Furthermore, Table F.3 of Chapter 4 shows that the number of tenured faculty members declined by about 3%, and the number of tenure-eligible faculty declined by about 16%, while the number of other full-time faculty more than doubled in statistics departments. In summary, in the nation's statistics departments, faculty growth did not keep up with enrollment growth, and at the same time there was a substantial shift away from tenured and tenure-eligible faculty.

C. Two-Year Colleges: Enrollment Declines While Faculty Enlarges, and Faculty Shifts Toward Temporary Staffing

Table SE.1 reveals a decline of about 7.5% in enrollments in two-year colleges from fall 1995 to fall 2000. During the same period, Table SF.6 reveals a roughly 2% increase in the number of full-time faculty in two-year colleges, from 7,742 in 1995 to 7,921 in 2000. At the same time, there was an increase of about 4% in the number of part-time faculty in two-year colleges. (Unlike the situation in four-year colleges and universities, the part-time faculty in two-year colleges vastly outnumber full-time faculty. In fall 2000 the ratio was almost 2 to 1, as can be seen in SF.13.) To understand the increase in full-time faculty mentioned above, recall that very few two-year colleges have a system of tenured and tenure-eligible faculty and instead divide their faculty into those on the "permanent staffing list" and "temporary full-time faculty." With that distinction in mind, Table F.6 in Chapter 4 reveals that the 2% overall growth in full-time faculty consists of a decrease of about 8% in the number of permanent full-time faculty and an almost six-fold increase in the number of temporary full-time faculty. In summary, the number of mathematics faculty in two-year colleges increased even though enrollments decreased between 1995 and 2000, and there was a noticeable shift away from staffing with permanent faculty.

D. The Degree Status of Four-Year Faculty

The percentage of four-year mathematics department faculty who hold doctoral degrees was 82% in fall 2000, down three percentage points from fall 1995. This may be due to the substantial increase in the number of faculty belonging to the "other full-time" category, only two fifths of whom hold doctoral degrees. Among tenured and tenure-eligible faculty in mathematics departments, 92% hold doctoral degrees, up two percentage points from 1995. Because it is almost certain that today's newly appointed tenure-eligible faculty either have, or soon receive, their doctoral degrees, the percentage of tenured and tenure-eligible faculty holding doctorates is likely to rise as more senior tenured faculty retire and are replaced.

In statistics departments, 95% of the fall 2000 faculty had doctoral degrees, up from 89% in 1995, and 99% of the tenured and tenure-eligible faculty had doctoral degrees, up from 91% five years earlier.

E. Faculty on Leave

When departments reported the data on tenured and tenure-eligible faculty used in Table SF.6, they were asked to report both the number of faculty members who are on leave in fall 2000, and the number teaching in the department in fall 2000. This was also the case in previous CBMS surveys and is necessary to insure that the survey gets an accurate picture of the nation's permanent mathematics faculty.

Because faculty members on leave from one department might be teaching as visitors in another, Table SF.6 may involve some double counting in the total number of the nation's mathematics faculty. However, any double-counted faculty members almost surely would be counted as permanent in their home department and temporary in their host department. Therefore the double counting will not affect the count of tenured faculty in four-year colleges and universities or the count of permanent faculty in two-year colleges.

In addition, the percentages of faculty on leave are relatively small. In fall 2000, about 7% of tenured and tenure-eligible mathematics faculty members were reported as on leave, with percentages ranging from about 10% in doctoral departments to about 5.5% in both masters and bachelors departments. In statistics departments, the overall percentage was about 7.6%, with 8% of faculty in doctoral departments and about 5% in masters level departments being on leave. For comparison, in fall 1995 the percentages were about 7% in mathematics departments and 6% in statistics departments.

TABLE SF.6 Number of tenured/tenure-eligible and other full-time faculty in Mathematics Departments at four-year colleges and universities and in Statistics Departments at universities by highest degree, and in 2000 by tenured and tenure-eligible and other full-time status. Also full-time permanent and full-time temporary faculty in two-year college Mathematics Programs: Fall 1980, 1985, 1990, 1995, and 2000.

						2000	
Four-Year College & University	1980	1985	1990	1995	2000	Tenured/ tenure-eligible	Other full-time
Mathematics Departments							
Total full-time faculty	**16022 (100%)**	**17849 (100%)**	**19411 (100%)**	**18248 (100%)**	**19007 (100%)**	**15471 (100%)**	**3536 (100%)**
Having doctoral degree	12497 (78%)	13208 (74%)	14963 (77%)	15428 (85%)	15643 (82%)	14275 (92%)	1368 (39%)
Having other degree	3525 (22%)	4641 (26%)	4448 (23%)	2820 (15%)	3364 (18%)	1196 (8%)	2168 (61%)
Statistics Departments							
Total full-time faculty	**610 (100%)**	**740 (100%)**	**735 (100%)**	**988 (100%)**	**1022 (100%)**	**871 (100%)**	**151 (100%)**
Having doctoral degree	587 (96%)	718 (97%)	706 (96%)	880 (89%)	972 (95%)	858 (99%)	114 (75%)
Having other degree	23 (4%)	22 (3%)	29 (4%)	108 (11%)	50 (5%)	13 (1%)	37 (25%)
Total Math & Stat Depts	**16,632**	**18,589**	**20,146**	**19,236**	**20,029**	**16,342**	**3,687**
Two-Year College Mathematics Programs						Full-time permanent	Full-time temporary
Total full-time faculty	**5,623**	**6,277**	**7,222**	**7,742**	**7,921**	**6,960**	**961**
Grand total	**22,255**	**24,866**	**27,368**	**26,978**	**27,950**	**23,302**	**4,648**

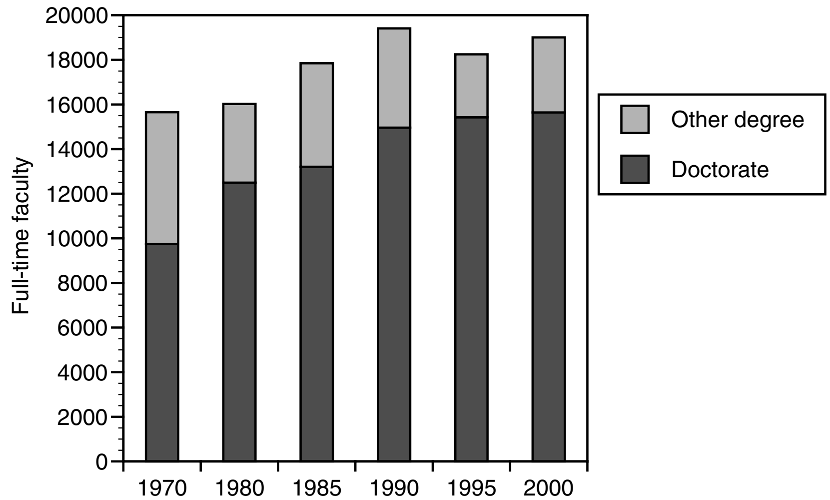

FIGURE SF.6.1 Number of full-time faculty by doctorate or other degree in Mathematics Departments at four-year colleges and universities: Fall 1970, 1980, 1985, 1990, 1995, and 2000.

TABLE SF.7: DEGREE STATUS OF PERMANENT MATHEMATICS FACULTY IN TWO-YEAR COLLEGES

Table SF.7 studies the academic background of permanent faculty members in the mathematics programs of two-year colleges. The masters degree is the highest degree held by over 80% of permanent two-year college mathematics faculty. The percentage of mathematics program faculty holding doctorates appears to have dropped between 1995 and 2000, and the percentage holding bachelors degrees as their highest degree seems to have risen. All three percentages are consistent with historical levels.

TABLE SF.7 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by highest degree: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

	Percentage of full-time permanent faculty					
Highest degree	1975	1980	1985	1990	1995	2000
Doctorate	11	15	13	17	17	16
Masters	82	80	82	79	82	81
Bachelors	7	5	5	4	1	3
	100%	100%	100%	100%	100%	100%
Number of full-time permanent faculty	**5944**	**5623**	**6277**	**7222**	**7578**	**6960**

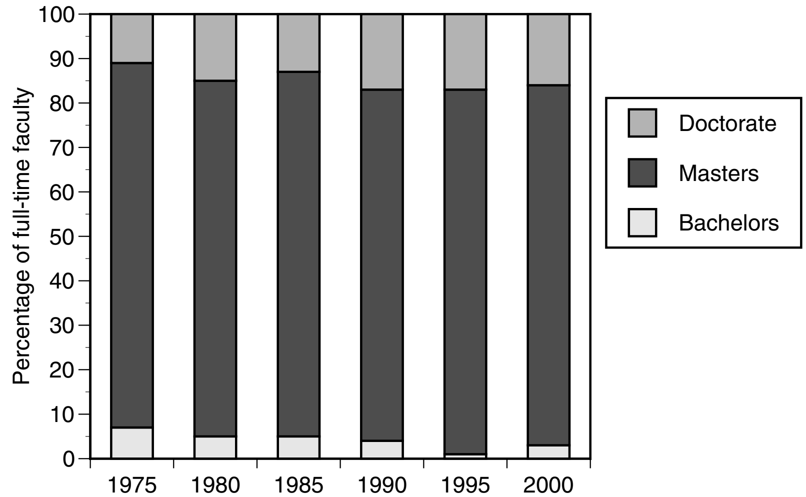

FIGURE SF.7.1 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by highest degree: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

TABLE SF.8: PERCENTAGE OF WOMEN AMONG THE FULL-TIME MATHEMATICS AND STATISTICS FACULTY

Table SF.8 reports overall figures on the gender distribution among full-time faculty in mathematics and statistics departments of four-year colleges and universities, and among the full-time mathematics program faculty in two-year colleges. The table also presents data on the number of doctorates granted (taken from annual reports of the Joint AMS-ASA-IMS-MAA Data Committee) and on masters degrees awarded (from the National Center for Educational Statistics). This information about doctoral and masters degrees can be used to estimate the gender distribution in the pools from which new full-time faculty are typically hired. For additional information on gender in the faculty of four-year colleges and universities, see Tables F.2 and F.3 in Chapter 4. See Tables TYR.24 and TYR.25 in Chapter 7 for more details about the gender composition of two-year college faculty.

Each CBMS survey between 1980 and 2000 detected an increase in the percentage of women in mathematics departments of four-year colleges and universities, and in fall 2000 the percentage of women faculty in mathematics departments approximated the percentage of women in recent Ph.D. graduating classes. The percentage of women among tenured and other full-time faculty rose by three and five percentage points respectively between 1995 and 2000, but the percentage of women among tenure-eligible mathematics department faculty dropped from 34% to 31% during that same period.

The percentage of women among the full-time faculty of statistics departments rose from 11% in 1995 to almost 18% in 2000, and the 18% figure was the highest up to that time. Among tenured statistics faculty, the percentage of women rose from 5% in 1995 to 9% in fall 2000, and among tenure-eligible faculty the percentage grew from 20% in 1995 to almost 34% in fall 2000.

The percentage of women among the full-time faculty of mathematics programs in two-year colleges has always been higher than the corresponding percentage in four-year schools, and in fall 2000 stood at 49%, up from 40% in 1995 and 34% in 1990. Since 1990, CBMS surveys have also gathered data about the gender composition of the "younger faculty" in two-year college mathematics programs. In 1990 and 1995, the term "younger faculty" was defined to mean faculty members of age less than 35, and in the CBMS2000 survey the definition was shifted to "age less than 40" (see Table SF.8). While this shift muddies comparisons, it is still interesting to observe that in 1990 and 1995 the percentage of women among the younger faculty was higher than the percentage of women among the overall two-year college mathematics faculty (51% v. 34% in 1990 and 46% v. 40% in 1995) while in 2000 the percentage of women in the (re-defined) younger faculty category was less than the overall percentage of women among the two-year college mathematics program faculty by four percentage points.

TABLE SF.8 Gender among full-time faculty in Mathematics Departments at four-year colleges and universities and in Statistics Departments at universities by type of appointment, and among permanent full-time faculty in two-year college Mathematics Programs: Fall 2000. Also gender among new PhDs from U.S. Mathematics Departments and Statistics Departments: 1980-2000. Historical data is also presented for Fall 1980, 1985, 1990 and 1995.

Four-Year College & University	1980	1985	1990	1995	2000	Tenured 2000	Tenure-eligible 2000	Other full-time 2000
Mathematics Departments								
Number of full-time faculty	16022	17849	19411	18248	19007	12335	3136	3536
Number of women	2243	2677	3843	3880	4673	2042	958	1673
	(14%)	(15%)	(20%)	(21%)	(25%)	(17%)	(31%)	(47%)
Statistics Departments								
Number of full-time faculty	na	740	735	988	1022	710	161	151
Number of women	na	74	105	107	179	66	54	59
		(10%)	(14%)	(11%)	(18%)	(9%)	(34%)	(39%)

	July 1, 1980-June 30, 2000	July 1, 1995-June 30, 2000
Number of PhDs from U.S. Math & Stat Depts[1]	19654	5779
Number of women among new PhDs[1]	4095	1453
	(21%)	(25%)

Two-Year College Mathematics Programs	1980	1985	1990	All full-time 1995	Full-time age<35 1995	All full-time 2000	Full-time age<40 2000
Number of full-time faculty	5623	6277	7222	7578	938	6960	1392
Number of women	1406	1946	2455	3031	431	3423	626
	(25%)	(31%)	(34%)	(40%)	(46%)	(49%)	(45%)

Master's Degrees in Mathematics granted in the U.S. in 1997-98[2]	3643
Number of women among new Masters[2]	1494
	(41%)

[1] First Annual Reports of the AMS-ASA-IMS-MAA Data Committee, Table 3-A, AMS Notices 1980-2000.
[2] 2000 Digest of Education Statistics, National Center for Education Statistics.

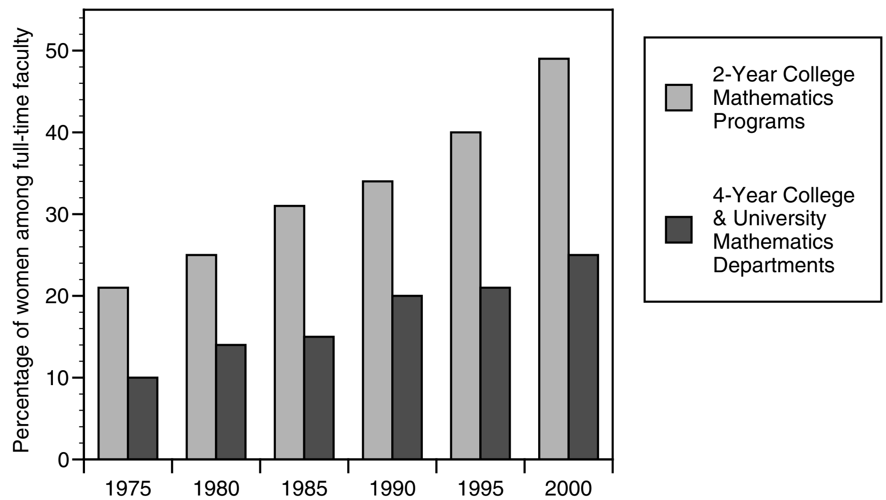

FIGURE SF.8.1 Percentage of women among full-time faculty in Mathematics Departments at four-year colleges and universities and in Mathematics Programs at two-year colleges: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

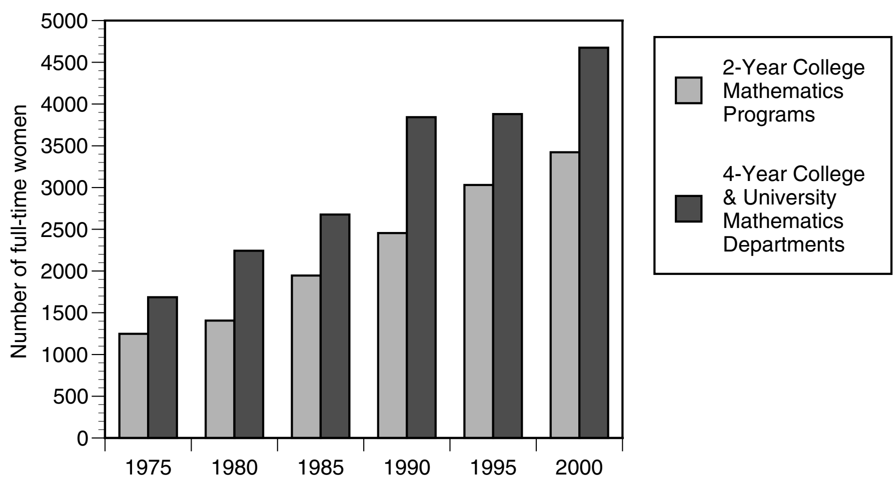

FIGURE SF.8.2 Number of women among full-time faculty in Mathematics Departments at four-year colleges and universities and in Mathematics Programs at two-year colleges: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

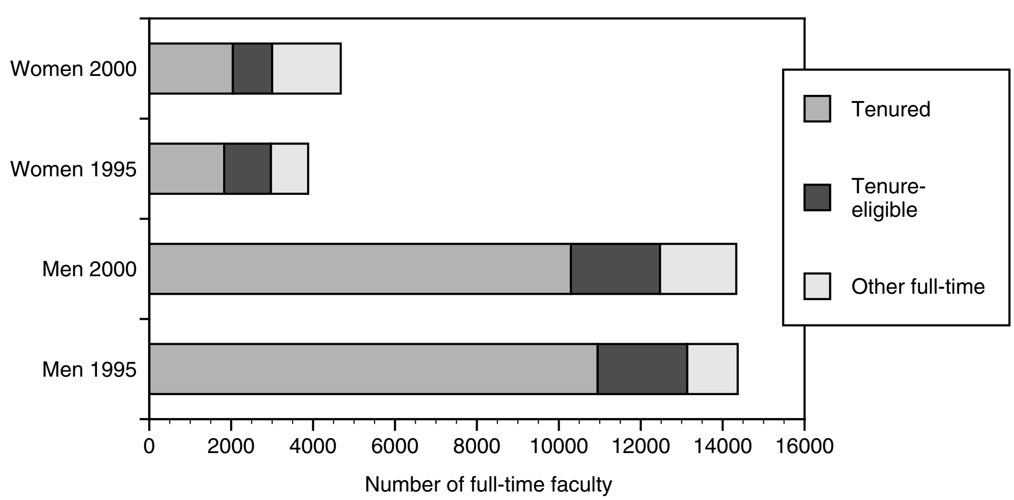

FIGURE SF.8.3 Number of tenured, tenure-eligible, and other full-time faculty by gender in Mathematics Departments at four-year colleges and universities: Fall 2000.

TABLES SF.9 AND SF.10: MATHEMATICS & STATISTICS FACULTY AGE DISTRIBUTION

These tables are not completely comparable with Tables SF.9 and SF.10 in the CBMS1995 report because the age categories were shifted slightly (e.g., 31–35 became 30–34) in the 2000 survey to make them consistent with age ranges used elsewhere. In Fall 2000, the median age for tenured and tenure-eligible mathematics faculty in four-year colleges and universities was about 51 while the median age for permanent faculty in the mathematics programs of two-year colleges was roughly 48. Between 1995 and 2000, the average (or mean) age declined slightly in mathematics departments and increased slightly in two-year college mathematics programs. The median age of tenured and tenure-eligible faculty in university statistics departments was about 48, and the mean age in statistics departments declined slightly between 1995 and 2000.

For more detailed information about faculty age distributions in four-year mathematics and statistics departments of various kinds, see Tables F.4 and F.5 in Chapter 4. More detailed information about faculty ages in two-year colleges appears in Tables TYR.32 and TYR.34 of Chapter 7.

TABLE SF.9 Percentage age distribution of tenured and tenure-eligible faculty in Mathematics Departments at four-year colleges and universities by gender. Percentage full-time permanent faculty in Mathematics Programs at two-year colleges. Also average ages: Fall 2000.

<table>
<tr><th rowspan="2">Four-Year College & University</th><th colspan="10">Percentage of tenured/tenure-eligible faculty</th><th rowspan="2">Total tenured/ tenure-eligible faculty</th><th rowspan="2">Average age 2000</th></tr>
<tr><th><30</th><th>30-34</th><th>35-39</th><th>40-44</th><th>45-49</th><th>50-54</th><th>55-59</th><th>60-64</th><th>65-69</th><th>>69</th></tr>
<tr><td>Mathematics Departments</td><td colspan="12"></td></tr>
<tr><td>Tenured men</td><td>0</td><td>1</td><td>4</td><td>8</td><td>11</td><td>11</td><td>15</td><td>11</td><td>3</td><td>2</td><td rowspan="4">100%
15471[1]</td><td>52.4</td></tr>
<tr><td>Tenured women</td><td>0</td><td>1</td><td>1</td><td>2</td><td>3</td><td>2</td><td>2</td><td>1</td><td>0</td><td>0</td><td>49.6</td></tr>
<tr><td>Tenure-eligible men</td><td>1</td><td>5</td><td>5</td><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>36.6</td></tr>
<tr><td>Tenure-eligible women</td><td>1</td><td>2</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>37.8</td></tr>
<tr><td>Total tenured & tenure-eligible faculty</td><td>2</td><td>9</td><td>12</td><td>13</td><td>14</td><td>15</td><td>18</td><td>12</td><td>3</td><td>2</td><td>100%
15471</td><td>49.0</td></tr>
</table>

<table>
<tr><th rowspan="2">Two-Year College Mathematics Programs</th><th colspan="8">Percentage of permanent full-time faculty</th><th rowspan="2">Total</th><th colspan="3">Average age</th></tr>
<tr><th><30</th><th>30-34</th><th>35-39</th><th>40-44</th><th>45-49</th><th>50-54</th><th>55-59</th><th>>59</th><th>1990</th><th>1995</th><th>2000</th></tr>
<tr><td>Full-time permanent faculty</td><td>4</td><td>9</td><td>13</td><td>11</td><td>15</td><td>20</td><td>16</td><td>11</td><td>100%
6960</td><td>45.4</td><td>47.2</td><td>47.6</td></tr>
</table>

Note: 0 means less than half of 1%. As a result, some marginal totals appear inaccurate.

[1] Total for all 4 rows in this block.

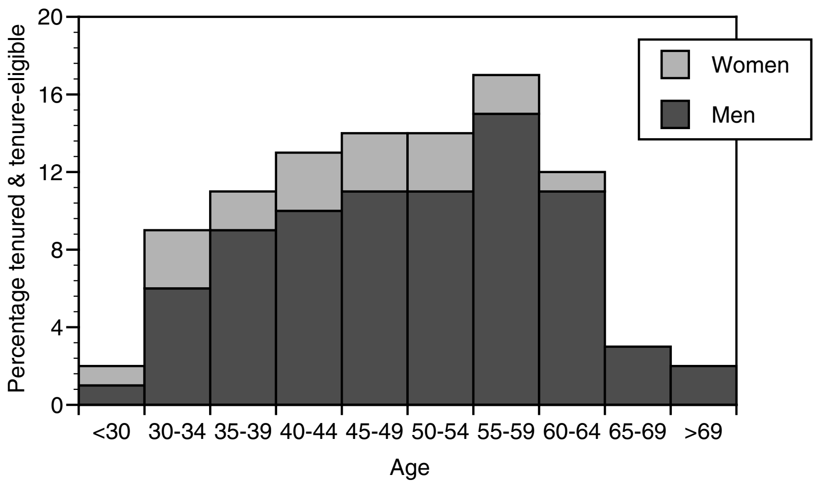

FIGURE SF.9.1 Percentage age distribution of tenured/tenure-eligible faculty in Mathematics Departments at four-year colleges and universities by gender: Fall 2000.

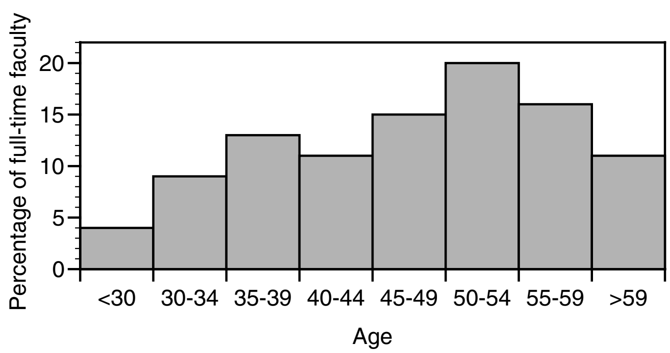

FIGURE SF.9.2 Percentage age distribution of full-time permanent faculty in Mathematics Programs at two-year colleges: Fall 2000.

TABLE SF.10 Percentage age distribution of tenured and tenure-eligible faculty in Statistics Departments at universities by gender. Also average ages: Fall 2000.

Statistics Departments	Percentage of tenured/tenure-eligible faculty										Total tenured/ tenure-eligible faculty	Average age
	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69		
Tenured men	0	1	5	10	14	13	16	10	3	3		52.3
Tenured women	0	0	1	2	2	1	0	1	0	0	**100%**	44.7
Tenure-eligible men	3	6	3	0	0	0	0	0	0	0	**871**[1]	32.9
Tenure-eligible women	1	3	1	1	0	0	0	0	0	0		34.5
Total tenured & tenure-eligible faculty	**4**	**10**	**10**	**13**	**16**	**14**	**16**	**11**	**3**	**3**	**100% 871**	**48.2**

Note: 0 means less than half of 1%. As a result, some marginal totals may appear inaccurate.

[1] Total for all four rows in box.

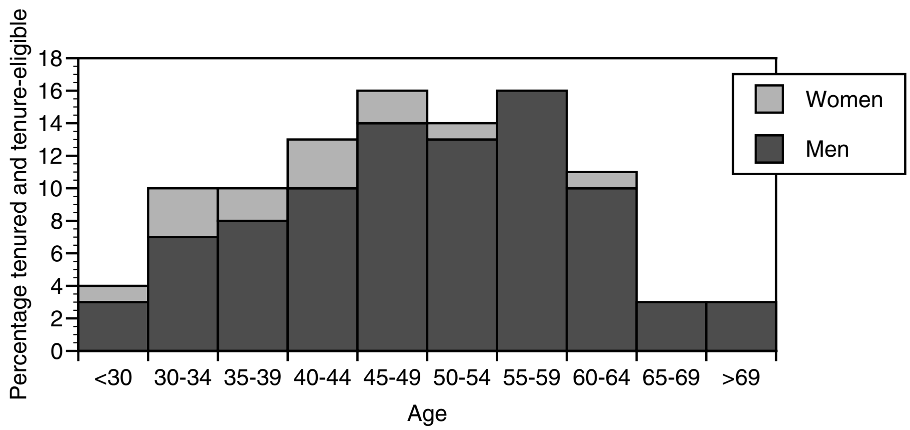

FIGURE SF.10.1 Percentage age distribution of tenured/tenure-eligible faculty in Statistics Departments at universities by gender: Fall 2000.

TABLES SF.11 AND SF.12: ETHNICITY AND GENDER IN MATHEMATICS AND STATISTICS DEPARTMENTS

Tables SF.11 and SF.12 describe the ethnic and gender composition of mathematics and statistics departments in four-year colleges and universities. Detailed information about mathematics and statistics departments in four-year colleges and universities, by type of department, appears in Tables F.6 and F.7 of Chapter 4. Detailed information about the ethnic composition of mathematics program faculty in two-year colleges can be found in Tables TYR.26 through TYR.34 in Chapter 7 of this report.

The CBMS1995 report found that there was little change between 1990 and 1995 in the ethnicity percentages reported in Tables SF.11 and SF.12. CBMS2000, on the other hand, detected some changes from 1995. For example, the percentage of Asians in the full-time mathematics faculty rose from 8% to 10% and the percentage of Hispanics rose from 1% to 3%. Perhaps the largest change was that the percentage of white males among the full-time faculty declined from 69% in 1995 to 63% in 2000, while the percentage of white women grew from 18% to 21%.

In statistics departments there were also changes in ethnic composition. Between 1995 and 2000, the percentage of Hispanics declined from 5% to 1%, the percentage of white males dropped from 66% to 63% and the percentage of white women grew from 8% to 13%.

TABLE SF.11 Percentage of gender and of racial/ethnic groups among tenured, tenure-eligible, and other full-time faculty in Mathematics Departments at four-year colleges and universities: Fall 2000.

	Percentage of faculty						
Mathematics Departments	American Indian/ Alaskan	Asian/ Pacific Islander	Black, not Hispanic	Mexican American/ Puerto Rican/ other Hispanic	White, not Hispanic	Not known	**Number of full-time faculty**
Tenured men	0	6	1	1	45	0	**100%** **19007**[1]
Tenured women	0	1	0	0	9	0	
Tenure-eligible men	0	2	0	1	9	0	
Tenure-eligible women	0	0	0	0	4	0	
Other full-time men	0	1	0	0	9	0	
Other full-time women	0	0	0	0	8	0	
Total full-time men	**0**	**8**	**2**	**2**	**63**	**1**	**100%** **19007**[2]
Total full-time women	**0**	**2**	**0**	**1**	**21**	**0**	

Note: 0 means less than half of 1% and this causes apparent column sum inconsistencies.
[1] Total for all six rows in this block.
[2] Total for both rows in this block.

TABLE SF.12 Percentage of gender and of racial/ethnic groups among tenured, tenure-eligible, and other full-time faculty in Statistics Departments at universities: Fall 2000.

	Percentage of faculty						
Statistics Departments	American Indian/ Alaskan	Asian/ Pacific Islander	Black, not Hispanic	Mexican American/ Puerto Rican/ other Hispanic	White, not Hispanic	Not known	**Number of full-time faculty**
Tenured men	0	10	0	1	50	3	
Tenured women	0	1	0	0	5	0	
Tenure-eligible men	0	4	0	0	6	1	**100%**
Tenure-eligible women	0	2	0	0	3	0	**1022**[1]
Other full-time men	0	2	0	0	6	0	
Other full-time women	0	1	0	0	5	0	
Total full-time men	**0**	**15**	**0**	**1**	**63**	**4**	**100%**
Total full-time women	**0**	**4**	**0**	**0**	**13**	**0**	**1022**[2]

Note: 0 means less than half of 1% and this causes apparent column sum inconsistencies.
[1] Total for all six rows in this block.
[2] Total for both rows in this block.

TABLE SF.13: RATIOS OF PART-TIME AND FULL-TIME FACULTY MEMBERS

Table SF.13 gives longitudinal data on the extent to which departments and programs relied on part-time rather than full-time faculty between fall 1980 and fall 2000 by displaying the ratio "number of part-time faculty per 100 full-time faculty."

This table also corrects an error in the SF.13 figures reported for mathematics program faculty in two-year colleges in the CBMS1995 report. CBMS1995 gave 7,578 as the number of all full-time faculty members. That figure was the number of *permanent* full-time faculty and, as can be seen from Table SF.6 of the 1995 report, the total of all permanent and temporary full-time faculty was really 7,742.

The number of part-time faculty rose in both two-year mathematics programs and four-year mathematics departments much faster than the number of full-time faculty. This is reflected in a noticeable increase in the ratio mentioned above in both two-year and four-year mathematics departments and programs. In statistics departments, by contrast, the ratio declined noticeably because the number of part-time faculty dropped to 66% of its 1995 level, while the number of full-time faculty increased.

Further elaborations on these data may be found in Tables F.2 and F.3 of Chapter 4. Detailed analysis of part-time and full-time faculty in two-year college mathematics programs appears in Tables TYR.17, TYR.19, and TYR.25 of Chapter 7.

TABLE SF.13 Number of full-time and part-time faculty in Mathematics Departments at four-year colleges and universities, in Statistics Departments at universities, and in Mathematics Programs at two-year colleges. Number of part-time faculty per 100 full-time faculty is also given: Fall 1980, 1985, 1990, 1995, and 2000.

Four-Year College & Universities	1980	1985	1990	1995	2000
Mathematics Departments					
Full-time faculty	16022	17849	19411	18248	19007
Part-time faculty	5456	7087	6786	5289	7161
Number of part-time per 100 full-time faculty	34	40	35	29	38
Statistics Departments					
Full-time faculty	610	740	735	988	1022
Part-time faculty	132	118	90	136	90
Number of part-time per 100 full-time faculty	22	16	12	14	9
Two-Year College Mathematics Programs					
Full-time faculty	5623	6277	7222	7742	7921
Part-time faculty	6661	7433	13680	14266	14887[1]
Number of part-time per 100 full-time faculty	118	118	189	184	188

[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., a school district, in a dual credit course.

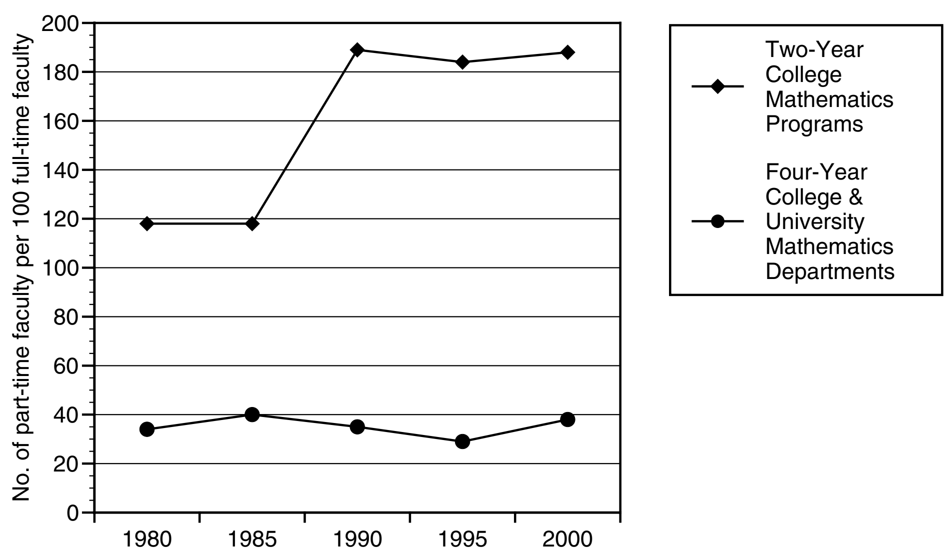

FIGURE SF.13.1 Number of part-time faculty per 100 full-time faculty in Mathematics Departments at four-year colleges and universities and in Mathematics Programs at two-year colleges: Fall 1980, 1985, 1990, 1995, and 2000.

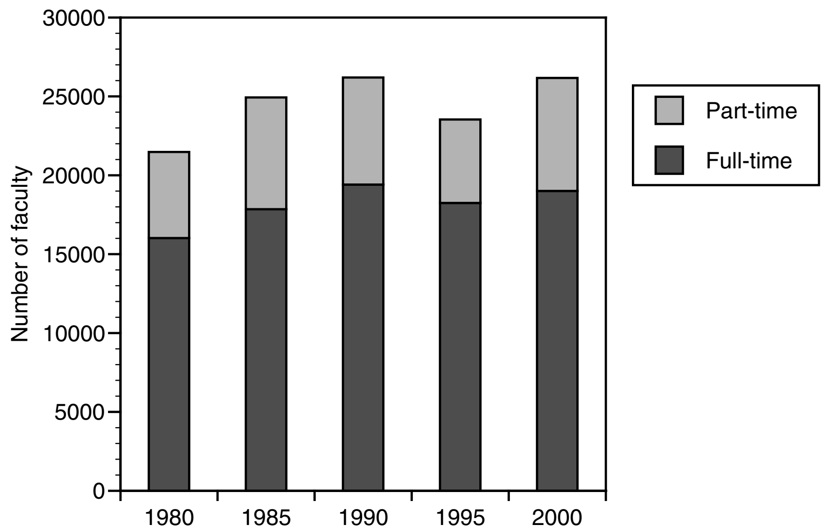

FIGURE SF.13.2 Number of full-time and part-time faculty in Mathematics Departments at four-year colleges and universities: Fall 1980, 1985, 1990, 1995, and 2000.

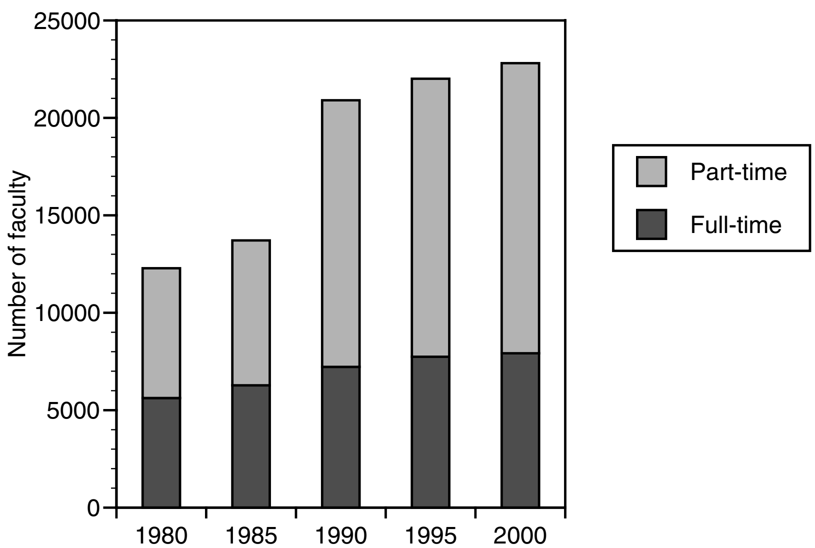

FIGURE SF.13.3 Number of full-time and part-time faculty in Mathematics Programs at two-year colleges: Fall 1980, 1985, 1990, 1995, and 2000.

TABLE SF.14: ETHNICITY AND GENDER AMONG PART-TIME FACULTY

Table SF.14 presents data on the ethnic and gender composition of the part-time faculty in four-year college and university mathematics and statistics departments and in two year college mathematics programs. Table F.8 in Chapter 4 provides more details. Information on the ethnic and gender composition of part-time faculty in two-year college mathematics programs appears in TYR.25, TYR.30, and TYR.31 of Chapter 7.

In four-year mathematics departments, the number of part-time faculty increased markedly, from 5,289 in fall 1995 to 7,161 in fall 2000. During those five years, there was a two point increase in the percentage of white males among the part-time faculty, and a four point increase in the percentage of white women. In statistics departments, which suffered serious declines in the overall number of part-time faculty between 1995 and 2000, the percentage of Asians increased while the percentage of black faculty dropped from 7% to less than half of one percent. At the same time, the percentage of white men among the statistics part-time faculty dropped from 51% to 48%, while the percentage of white women rose from 18% to 27%.

TABLE SF.14 Percentage of gender and of racial/ethnic groups among part-time faculty in Mathematics Departments and Statistics Departments at four-year colleges and universities and in Mathematics Programs at two-year colleges: Fall 2000.

	Percentage of part-time faculty						
	American Indian/ Alaskan %	Asian/ Pacific Islander %	Black, not Hispanic %	Mexican American/ Puerto Rican/ other Hispanic %	White, not Hispanic %	Not known %	**Total number of part-time faculty**
Mathematics Departments							
Part-time faculty, men	0	2	2	2	53	1	**7161**
Part-time faculty, women	0	1	1	1	37	1	
Statistics Departments							
Part-time faculty, men	0	17	0	2	48	0	**90**
Part-time faculty, women	0	6	0	2	27	0	
Two-Year Colleges							
Part-time faculty, total	0	4	6	3	82	5	**14887**

Note: 0 means less than half of 1%. Round-off causes blocks to add to more than 100%.

TABLE SF.15: DEATHS AND RETIREMENTS AMONG MATHEMATICS AND STATISTICS FACULTY, AND NEW FACULTY POSITIONS IN 1999–2000

Table SF.15 reports the number of deaths and retirements among tenured and tenure-eligible faculty in mathematics and statistics departments of four-year colleges and universities, and the number of deaths and retirements among permanent faculty in mathematics programs of two-year colleges, in the 1999–2000 academic year. In 1999–2000, about 3% of tenured and tenure-eligible faculty members left college and university mathematics departments through death or retirement. In statistics departments, and in the mathematics programs of two-year colleges, the percentage was closer to 2%.

The CBMS2000 percentage figures for deaths and retirements in four-year college and university mathematics and statistics departments are consistent with the results of an independent survey conducted by the Joint Data Committee of the AMS, ASA, IMS, and MAA [*Notices Amer. Math. Soc.* **48** (2001), p. 820].

The number of deaths and retirements from the four-year college and university faculty in 1999–2000 was far lower that the number of new Ph.D.s awarded — the Joint Data Committee survey showed that there were 1,127 new Ph.D. degrees awarded in the U.S. in 1999–2000 [*Notices Amer. Math. Soc.* **48** (2001), p. 710]. However, there still seemed to be an adequate number of new positions for the new doctoral recipients. There were 1,854 advertised searches for doctoral faculty in 1999–2000, with 1,134 being tenured and tenure-track positions for which new Ph.D. recipients were eligible to apply [*Notices Amer. Math. Soc.* **48** (2001), p. 821].

TABLE SF.15 Number of deaths and retirements of tenured/tenure-eligible faculty from Mathematics Departments and from Statistics Departments by type of school, and of full-time permanent faculty from Mathematics Programs at two-year colleges between September 1, 1999 and August 31, 2000. Historical data is included when available.

Four-Year College & University	1979-80	1984-85	1989-90	1994-95	1999-2000	Number of tenured/tenure-eligible faculty 2000
Mathematics Departments						
Univ(PhD)	na	na	135	172	174	5521
Univ(MA)	na	na	68	132	165	3932
Coll(BA)	na	na	119	137	123	6018
Total deaths and retirements in all Mathematics Departments	156	220	322	441	462	15471
Total deaths and retirements in all Statistics Departments	na	na	17	33	16	871
Two-Year College Mathematics Programs						Number of full-time permanent faculty 2000
Total deaths and retirements in all Mathematics Programs	na	na	na	274	163	6960

TABLE SF.16: AVERAGE TEACHING ASSIGNMENTS IN MATHEMATICS AND STATISTICS DEPARTMENTS OF FOUR-YEAR COLLEGES AND UNIVERSITIES

Table SF.16 presents data on the average teaching assignment (in contact hours) in mathematics and statistics departments of four-year colleges and universities for tenured and tenure-eligible faculty, by type of department, in fall 2000. Table TYR.18 in Chapter 7 presents analogous data for mathematics programs of two-year colleges.

In about 87% of doctoral mathematics departments, a teaching assignment of at most eight contact hours was typical in fall 2000. This is roughly the same conclusion that one would draw from the CBMS1995 data. Among masters-level departments, 90% had typical fall 2000 teaching assignments between nine and twelve contact hours per week, higher than the corresponding percentage in 1995. In fall 2000, a twelve contact hour assignment was very typical in bachelors-only mathematics departments. Comparisons to 1995 data suggest that bachelors-level mathematics departments were substantially more likely to have twelve contact hour assignments in fall 2000 than in fall 1995.

Ninety-seven percent of doctoral statistics departments had teaching assignments of six or fewer contact hours per week in fall 2000. This is quite different from the situation in 1995, when 32% of doctoral statistics departments reported typical teaching assignments of 7 to 12 contact hours per week. The number of masters-level statistics departments is quite low, and the percentages reported for those departments in Table SF.16 are hard to interpret.

As Table TYR.18 in Chapter 6 shows, in fall 2000 the average teaching assignment in the mathematics programs of two-year colleges was slightly less than 15 contact hours per week. This average was down by one hour per week from the average in fall 1995.

TABLE SF.16 Percentage of departments having various weekly teaching assignments in classroom contact hours for tenured/tenure-eligible faculty in Mathematics Departments and Statistics Departments by type of school: Fall 2000.

	Percentage of departments having various levels of typical teaching assignments (in contact hours)						
	< 6 hrs %	6 hrs %	7–8 hrs %	9–11 hrs %	12 hrs %	>12 hrs %	Number of schools
Mathematics Departments							
Univ (PhD)	14	56	17	6	6	2	187
Univ (MA)	2	0	6	44	46	2	233
College (BA)	0	1	3	23	63	10	1010
Statistics Departments							
Univ (PhD)	34	63	2	0	0	0	57
Univ (MA)	14	57	0	0	29	0	13

Note: 0 means less than half of 1%. Round-off causes blocks to add to more than 100%.

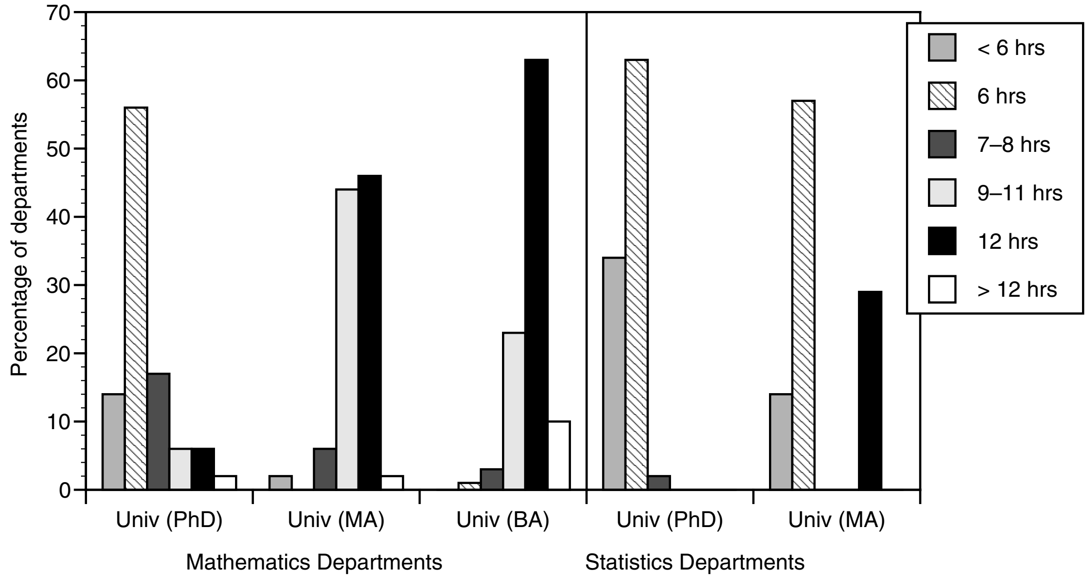

FIGURE SF.16.1 Percentage of Mathematics Departments and Statistics Departments in four-year colleges and universities having various weekly teaching assignments in classroom contact hours for tenured and tenure-eligible faculty by type of school: Fall 2000.

TABLE SF.17: WHO TEACHES VARIOUS TYPES OF COURSES?

Table SF.17 is a new table for the CBMS surveys. It corresponds to part of Table SFY.17 in the CBMS1995 report and shows the percentage of enrollments taught by various types of instructors (tenured and tenure-eligible, other full-time, part-time, and graduate teaching assistants) in college and university mathematics and statistics departments. In addition, for two-year colleges, Table SF.17 shows the percentage of sections (rather than of enrollment) taught by full-time faculty (both permanent and temporary) and by part-time faculty.

As was the case with previous CBMS surveys, we made the assumption that all advanced level courses in four-year colleges and universities were taught by tenured and tenure-eligible faculty. For other courses, departments responding to the CBMS2000 were asked to classify the instructors of each of their course sections. Because some departments that responded to the survey did not identify the instructors for all of their sections, Table SF.17 contains an "unknown instructor" column. Part, but not all, of this unknown instructor category is due to course sections that were taught by distance learning (see Chapter 2). The existence of the unknown instructor column makes comparisons with 1995 data somewhat difficult.

A. Staffing Trends in Mathematics Departments

If we ignore the problems associated with the unknown instructor column, several conclusions are evident from Table SF.17. First, in every course category, we see substantial declines in the percentage of enrollment taught by tenured and tenure-eligible faculty, and declines in the percentage of enrollment taught by graduate teaching assistants, between fall 1995 and fall 2000. In each course category within mathematics departments, the percentage of enrollment taught by other full-time and part-time faculty increased by between three and seven points.

Even if we take the unknown instructor column into account, we can say that there were increases in the percentage of students taught by other full-time and part-time faculty, and those increases might be quite large. For example, if it happened that all unknown instructors in the "Mathematics Courses 2000" row actually belonged to the other-full-time category, then the increase in teaching by other full-time faculty would be ten percentage points rather than four. Furthermore, even if all of the unknown instructors in a given course category were tenured and tenure-eligible faculty members, we would still conclude that the percentage of enrollment taught by tenured and tenure-eligible faculty decreased between fall 1995 and fall 2000. However, whether there was a decrease in the percentage of mathematics department enrollment taught by graduate teaching assistants depends upon how many of the unknown instructors were actually graduate students.

B. Staffing Trends in Statistics Departments

If one ignores the unknown instructor column, Table SF.17 leads to the conclusion that between 1995 and 2000, statistics departments saw the same staffing trends as did mathematics departments, namely, smaller proportions of students being taught by tenured and tenure-eligible faculty and by graduate teaching assistants, with a corresponding increase in the percentage of students taught by other full-time and part-time faculty members. Even if one takes the unknown instructor column into consideration, one sees that there was no increase in the percentage of teaching by tenured and tenure-eligible faculty, coupled with a decrease in teaching by graduate students, and possible near doublings in the percentage of students taught by other full-time and part-time faculty.

C. Staffing Trends in Two-Year Colleges

Two-year colleges typically do not have a tenure track and instead divide faculty into full-time (both permanent and temporary) and part-time. Note that the two-year college data in SF.17 shows percentage of *sections* rather than percentage of *enrollments*. The percentage of sections taught by full-time faculty declined between 1995 and 2000, and there was a corresponding increase in sections taught by part-time faculty.

TABLE SF.17 Percentage of enrollment 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 two-year colleges: Fall 1995 and Fall 2000. Also total enrollments (in 1000s).

	Percentage taught by					
Four-Year College & University	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Total enrollment in 1000s
Mathematics Departments[1]						
Mathematics courses 2000	44	18	22	10	6	1614
Mathematics courses 1995	51	14	19	17	--	1469
Statistics courses 2000	56	13	19	5	7	171
Statistics courses 1995	70	6	15	7	--	143
Computer Science courses 2000	47	20	22	0	11	123
Computer Science Courses 1995	67	14	18	0	--	99
All Mathematics Department courses 2000	45	18	22	9	6	1909
All Mathematics Department courses 1995	54	13	15[2] 19	13[2] 15	--	1711
Statistics Departments[1]						
All Statistics Department courses 2000	51	13	13	18	5	74
All Statistics Department courses 1995	56	9	7	29	--	65

Two-Year College Mathematics Programs	Full-time %	Part-time %	Enrollment in 1000s
All Mathematics Programs courses 2000	54[3]	46[3]	1386
All Mathematics Programs courses 1995	62[3]	38[3]	1498

[1] We assume that all upper level and advanced courses are taught by tenured and tenure-eligible faculty.
[2] These figures correct typographical errors in CBMS 1995 Table SF.17.
[3] Percentage of sections taught by full-time and part-time faculty.

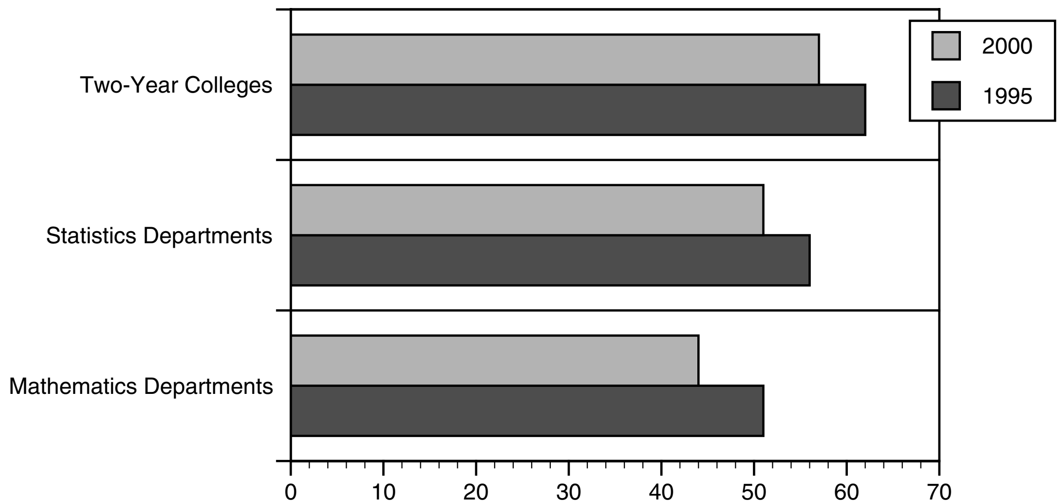

FIGURE SF.17.1 Percentage of enrollment taught by tenured/tenure-eligible faculty in Mathematics and Statistics Departments in colleges and universities, and percentage of sections taught by full-time faculty (permanent and temporary) in two-year college Mathematics Programs: Fall 1995 and Fall 2000.

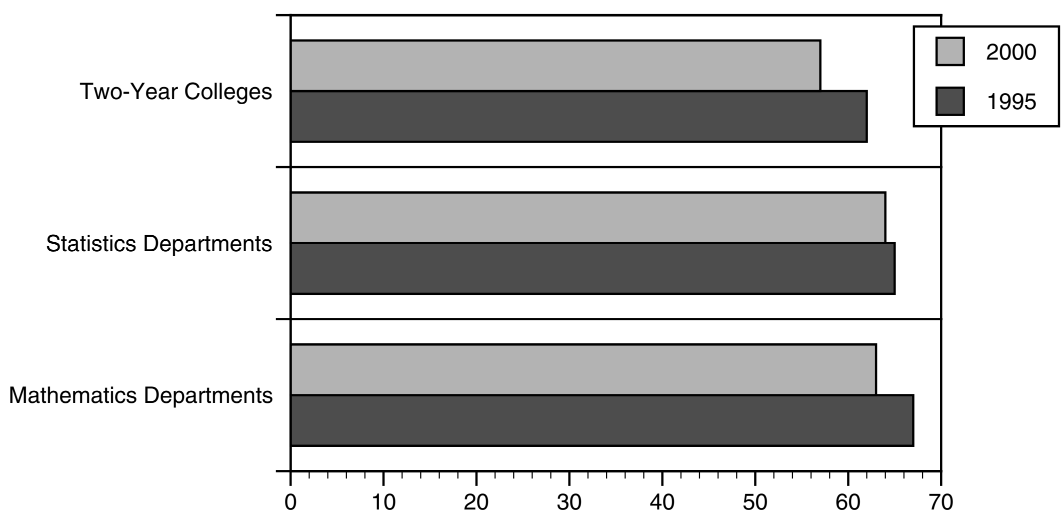

FIGURE SF.17.2 Percentage of enrollments taught by full time faculty (tenured, tenure-eligible, and other full time) in Mathematics and Statistics Departments of colleges and universities, and percentage of sections taught by full-time faculty (permanent and temporary) in two-year colleges: Fall 1995 and Fall 2000.

TABLE SFY.18: WHO TEACHES FIRST-YEAR COURSES?

Table SFY.18 presents a summary of who taught the nation's *first-year* mathematical sciences courses in two-year college mathematics programs and in the mathematics and statistics departments of four-year colleges and universities, giving corresponding data for fall 1995 and fall 2000. Table SFY.18 presents data on the percentages of enrollments in first-year courses taught by tenured and tenure-eligible faculty, other full-time faculty, part-time faculty, and graduate teaching assistants. In addition, because departments did not report the teachers of some of their sections in the CBMS2000 survey, there is a column corresponding to unknown instructors. Part, but far from all, of the unknown instructors column is accounted for by sections of courses taught by distance education (see Chapter 2). The size of the unknown instructor column makes comparisons between data from CBMS2000 and CBMS1995 problematic in some cases.

A. First-Year Courses in Four-Year Mathematics Departments

If one ignores the unknown instructor column and makes an entry-by-entry comparison between Table SFY.18 in the current report and the corresponding table (Table SFY.17) in the CBMS1995 report, one sees very clear trends in the data. One concludes that in four-year mathematics departments, between fall 1995 and fall 2000 there was a substantial decline in the percentage of undergraduate enrollments taught by tenured and tenure-eligible faculty in first-year mathematics, statistics, and computer science courses, except in remedial level mathematics courses where there was a slight increase. For example, in both the introductory and calculus levels, the percentage of enrollment taught by tenured and tenure-eligible faculty dropped by ten percentage points, and in elementary level statistics courses and lower-level computer science courses the percentage dropped by almost twenty percentage points. In addition, there were increases in every course category in the percentage of enrollments taught by other full-time faculty, and (except in remedial mathematics courses) there was an increase in percentage of enrollments taught by part-time faculty. Finally in every course category other than computer science courses, the percentage of enrollments taught by graduate teaching assistants decreased. In the remedial and introductory levels, the declines in teaching by graduate students were at approximately the ten percentage point level.

Even after one takes account of the unknown instructor column in the CBMS2000 report, some conclusions remain unavoidable. For example, in every course category listed in SFY.18 except for remedial courses, the percentage of enrollment taught by part-time faculty increased. The only question was the amount of the increase. For introductory level courses, the increase was somewhere between 6% and 13% and for calculus level courses, the increase was somewhere between 3% and 6%. Next, even if all unknown instructors were actually tenured and tenure-eligible, in every course category listed in SFY.18 except remedial courses, there was a decrease in the percentage of enrollment taught by tenured and tenure-eligible faculty between fall 1995 and fall 2000. Finally, even if all unknown instructors were graduate teaching assistants, there was a decline in the percentage of remedial level and introductory level students taught by graduate teaching assistants. The only possible increase in teaching by graduate students was in calculus level courses, under the assumption that all unknown instructors were graduate teaching assistants, and in that case, the increase would be at most one percentage point.

Further information about who teaches first-year calculus and elementary-level statistics courses in mathematics departments can be found in Tables FY.1, FY.3, and FY.5 in Chapter 5.

B. First-Year Courses in Statistics Departments

An entry-by-entry comparison of teaching percentages from fall 1995 and fall 2000 would lead to the conclusion that the percentage of enrollment in first-year elementary-level statistics courses (no calculus prerequisite) taught by tenured and tenure-eligible faculty members decreased by eight percentage points, and the percentage of enrollment taught by graduate students dropped by thirteen points. The percentage of enrollment taught by other full-time faculty rose substantially, and the percentage taught by part-time faculty doubled.

Some of those conclusions remain valid even when the unknown instructor column is considered in the most conservative way. Even if all unknown instructors were tenured or tenure-eligible, there was still a decline in the percentage of enrollment in statistics departments' elementary courses taught by tenured and tenure-eligible faculty. Even if all unknown instructors were graduate students, there was still a seven point decrease in graduate student teaching. Furthermore, no matter who the unknown instructors were, there was still a substantial increase in the percentage of enrollment taught by other full-time and part-time faculty, and the increase may have been quite large.

Further details on who teaches elementary-level statistics courses in statistics departments can be found in Table FY.6 of Chapter 5.

C. Two-Year College Mathematics Programs

CBMS2000 data on two-year colleges show percentages of sections, not percentages of enrollments, and do not have unknown instructor problems. Recall that two-year colleges typically do not have a tenure track but instead divide their full-time faculty into permanent and temporary faculty (see Table SF.6 in this chapter).

As in four-year colleges, there was a decline in the percentage of sections taught by full-time faculty. In fall 1995, full-time faculty members taught 62% of all two-year college mathematics program sections. By fall 2000, that percentage had declined to 54%, with a corresponding increase in sections taught by part-time faculty. For more detailed information about who teaches various kinds of two-year college courses, see Table TYR.9 in Chapter 6.

TABLE SFY.18 Percentage of enrollment in lower division courses of various types in Mathematics and Statistics Departments of colleges and universities, by type of instructor, and percentage of sections taught by full-time and part-time faculty in Mathematics Programs of two-year colleges: Fall 1995 and 2000. Also total enrollments (in 1000s).

	Percentage taught by					
Four-Year College & University	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Total enrollment in 1000s
Mathematics Department courses						
Mathematics courses						
Remedial level 2000	15	18	45	12	10	219
Remedial level 1995	14	14	46	26	--	222
Introductory level 2000	30	23	27	13	7	723
Introductory level 1995	40	18	21	22	--	613
Calculus level 2000	61	16	12	8	3	570
Calculus level 1995	71	11	9	10	--	538
Statistics courses						
Elementary level 2000	45	16	24	7	8	136
Elementary level 1995	63	7	19	11	--	115
Computer Science courses						
Lower level 2000	39	24	26	1	10	90
Lower level 1995	60	16	24	1	--	74
Statistics Department Courses						
Elementary level 2000	33	18	18	25	6	54
Elementary level 1995	41	12	9	38	--	49
Two-Year College Mathematics Programs						
All courses 2000	54[1]		46[1]			1386
All courses 1995	62[1]		38[1]			1498

[1] Percentage of sections taught by full-time (permanent and temporary) and part-time faculty.

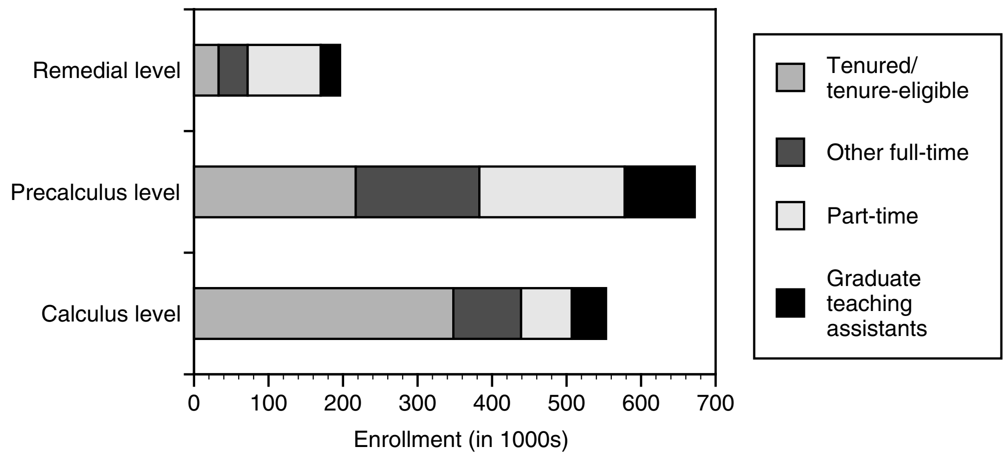

FIGURE SFY.18.1 Enrollment (in 1000s) in lower division undergraduate Mathematics courses in Mathematics Departments at four-year colleges and universities by level of course and type of instructor: Fall 2000.

TABLE SFY.19: WHO TEACHES MAINSTREAM CALCULUS IN TWO- AND FOUR-YEAR COLLEGES AND UNIVERSITIES?

Table SFY.19 presents data on the percentage of enrollments in mainstream Calculus I and II taught by various types of faculty (tenured and tenure-eligible, other full-time, part-time, and graduate teaching assistants) in mathematics departments of four-year colleges and universities, and by full-time or part-time faculty in two-year college mathematics programs. This table corresponds to Table SFY.18 in the CBMS1995 report. For further elaborations of this data, see Table FY.1 in Chapter 5 for four-year colleges and universities, and Tables TYR.8 and TYR.9 in Chapter 6 for two-year colleges.

A. Enrollment Trends in Mainstream Calculus Courses

In four-year colleges and universities, enrollments in mainstream Calculus I declined by about 1% between fall 1995 and fall 2000, and mainstream Calculus II enrollments rose by about 5%. Although not a part of this table, it may be worth noting that enrollments in later mainstream calculus courses grew by almost 18%, to 73,000 (see Appendix I). By contrast, two-year college enrollments in mainstream Calculus I and II declined by 9% and 13% respectively from 1995 levels.

B. Staffing Trends in Mainstream Calculus Courses

As in Tables SF.17 and SFY.18, the existence of the unknown faculty column makes comparisons between fall 2000 and fall 1995 data more difficult. However, some conclusions remain possible. Even if every unknown instructor in the course total rows belonged to the tenured and tenure-eligible category, it would still be true that the data from fall 2000 show a decline in the percentage of mainstream calculus enrollment taught by tenured and tenure-eligible faculty. The percentage of teaching by other full-time and part-time faculty increased no matter who the unknown instructors were. Whether graduate student teaching in mainstream calculus was unchanged or actually rose between fall 1995 and fall 2000 depends upon the composition of the unknown instructor column. If one ignores the unknown instructors, one would say that the percentage of enrollment taught by graduate teaching assistants remained unchanged in both mainstream calculus courses. But if it happened that all unknown instructors were actually graduate students, then one would conclude that the percentage of mainstream calculus teaching by graduate teaching assistants rose between fall 1995 and fall 2000.

In two-year colleges, the percentage of sections (not enrollments) of mainstream Calculus I taught by full-time faculty (both permanent and temporary) did not change between 1995 and 2000, and the percentage of sections of mainstream Calculus II taught by full-time faculty rose by six percentage points.

TABLE SFY.19 Percentage of enrollment in Mainstream Calculus I and II taught by tenured/tenure-eligible, other full-time, part-time faculty, graduate teaching assistants, and unknown 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 two-year colleges: Fall 2000. Also total enrollments (in 1000s) and average section sizes.

	Percentage of enrollment taught by						
Four-Year College & Universities	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Enrollment in 1000s	Average section size
Mainstream Calculus I							
Large lecture/recitation	62	18	9	8	3	68	47
Regular section <36	63	16	11	5	5	91	24
Regular section >35	50	22	15	11	2	31	40
Course total 2000	60	18	11	7	4	190	32
Course total 1995	73	12	8	7	--	192	33
Mainstream Calculus II							
Large lecture/recitation	63	18	7	5	7	28	50
Regular section <36	69	11	12	6	2	46	25
Regular section >35	61	13	9	16	1	13	42
Course total 2000	66	13	10	7	4	87	32
Course total 1995	74	12	5	10	--	83	30
Total Mnstrm Calculus I & II 2000	62	16	11	7	4	277	32
Total Mnstrm Calculus I & II 1995	73	12	7	8	--	275	32

	Percentage of sections taught by			
Two-Year College Mathematics Programs	Full-time %	Part-time %	Enrollment in 1000s	Average section size
Mainstream Calculus I 2000	84	16	53	23
Mainstream Calculus I 1995	84	16	58	25
Mainstream Calculus II 2000	87	13	20	20
Mainstream Calculus II 1995	81	19	23	23
Total Mnstrm Calculus I & II 2000	85	15	73	22
Total Mnstrm Calculus I & II 1995	83	17	81	24

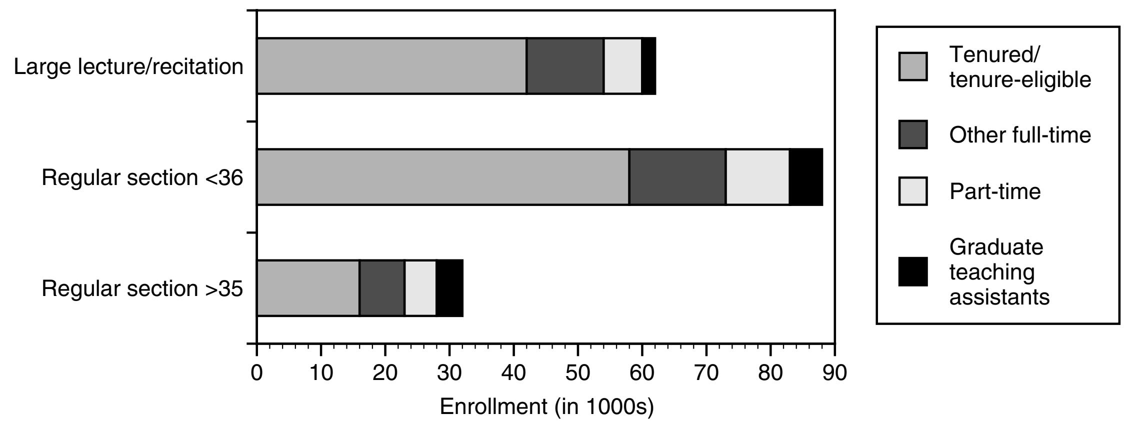

FIGURE SFY.19.1 Enrollment (in 1000s) in Mainstream Calculus I taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in Mathematics Departments at four-year colleges and universities by size of sections: Fall 2000.

TABLE SFY.20: HOW IS MAINSTREAM CALCULUS TAUGHT?

Table SFY.20 presents data on the percentage of enrollment in mainstream Calculus I and II in fall 2000 that was taught using various reform pedagogies in four-year colleges and universities, and on the percentage of sections taught using reform pedagogies in the mathematics programs of two-year colleges. Four of the pedagogical options studied — graphing calculators, writing assignments, computer assignments, and group projects — were also studied in earlier CBMS surveys. The fifth option in CBMS2000 was “meeting at least once a week in a setting that requires student computer use” which is abbreviated to “weekly computer lab” in the heading of the table. The computer lab option replaced a question in the CBMS1995 survey about the percentage of sections that were “taught using a reform text.” The reform text question was dropped because by fall 2000 the term “reform text” was no longer well defined, with almost every textbook publisher claiming to use aspects of calculus reform in almost every calculus textbook.

Comparison of CBMS2000 data with the findings of previous CBMS surveys makes it clear that the use of graphing calculators and computer assignments rose substantially between fall 1995 and fall 2000 in mainstream Calculus I and II in both two- and four-year colleges and universities. In two-year colleges, graphing calculator use in mainstream calculus courses reached almost 80% in fall 2000, while in mathematics departments of four-year colleges and universities, the percentage was closer to 50%. Between fall 1995 and fall 2000, the use of writing assignments and group projects increased in both Calculus I and II in two-year colleges. However, in four-year colleges and universities, the use of group projects as a teaching tool declined in the same five year period, and while the use of writing assignments rose in mainstream Calculus I, it fell in mainstream Calculus II. It is apparent that in fall 2000 most reform pedagogies were used to a much greater extent in two-year colleges than in four-year colleges and universities. The only exception to that statement is in the area of computer lab use: in all kinds of departments and programs, in fall 2000 about one in six mainstream calculus students had class at least once each week in a situation requiring student computer use.

For a study of the use of reform pedagogies in bachelors, masters, and doctoral departments, see Table FY.2 in Chapter 5. For more information about the use of reform methods in the entire spectrum of two-year college mathematics, statistics, and computer science courses, see Table TYR.10 in Chapter 6.

TABLE SFY.20 Percentage of enrollment in Mainstream Calculus I and II taught using various reform methods in Mathematics Departments of four-year colleges and universities by size of sections, and percentage of sections taught using various reform methods in two-year college Mathematics Programs: Fall 2000 (Figures in parentheses show percentages from 1990 and 1995). Also total enrollments (in 1000s) and average section sizes.

	Percentage taught using						
Four-Year Colleges & Universities	Graphing calculators %	Writing assignments %	Computer assignments %	Group projects %	Weekly computer lab %	Enrollment in 1000s	Average section size
Mainstream Calculus I							
Large lecture/recitation	40	23	20	14	17	68	47
Regular section <36	61	29	34	21	17	91	24
Regular section >35	50	31	46	24	13	31	40
Course total	51	27	31	19	17	190	32
(1990,1995) data	(3,37)	(10,22)	(9,18)	(3,23)	na	192	33
Mainstream Calculus II							
Large lecture/recitation	45	17	22	14	19	28	50
Regular section <36	53	18	25	17	12	46	25
Regular section >35	33	20	40	11	13	13	42
Course total	48	18	27	15	14	87	32
(1990,1995) data	(2,29)	(9,24)	(7,17)	(2,20)	na	83	30
Total Mnstrm Calculus I & II	50	24	30	18	16	277	32
1995 data	35	23	18	22	na	275	32
Two-Year Colleges							
Mainstream Calculus I	78	31	35	27	17	53	23
1995 data	65	20	23	22	na	58	25
Mainstream Calculus II	74	25	37	25	16	20	20
1995 data	63	13	16[1]	18[1]	na	23	23
Total Mainstream Calculus I & II	76	28	35	27	17	73	22
1995 data	65	18	24	22	na	81	24

[1] These entries correct typographical errors in CBMS 1995 Table SFY.20.

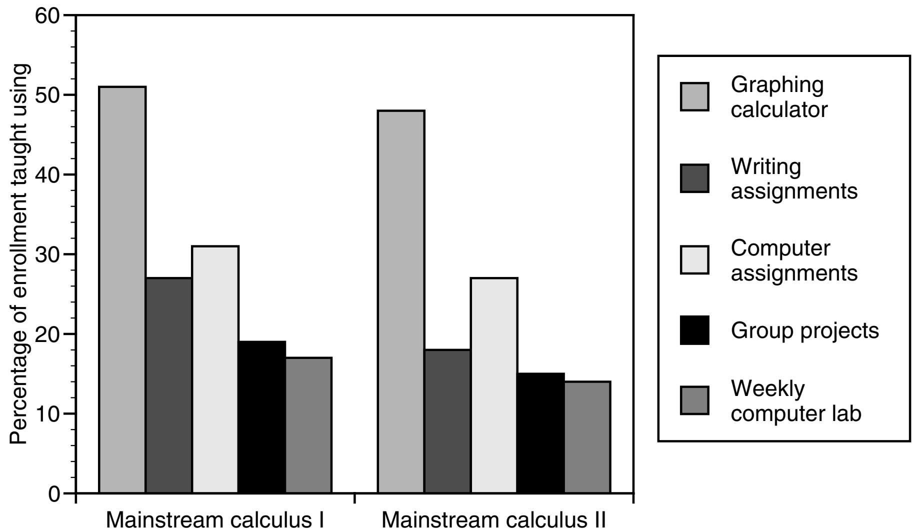

FIGURE SFY.20.1 Percentage of enrollment in Mainstream Calculus I and Mainstream Calculus II taught using various reform methods in Mathematics Departments at four-year colleges and universities: Fall 2000.

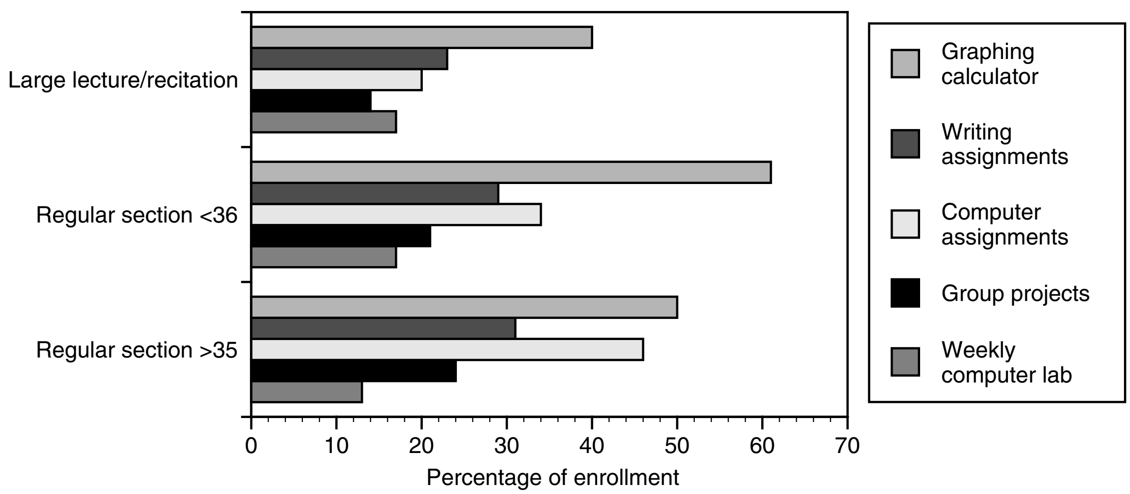

FIGURE SFY.20.2 Percentage of enrollment in Mainstream Calculus I taught using various reform methods in Mathematics Departments at four-year colleges and universities by size of sections: Fall 2000.

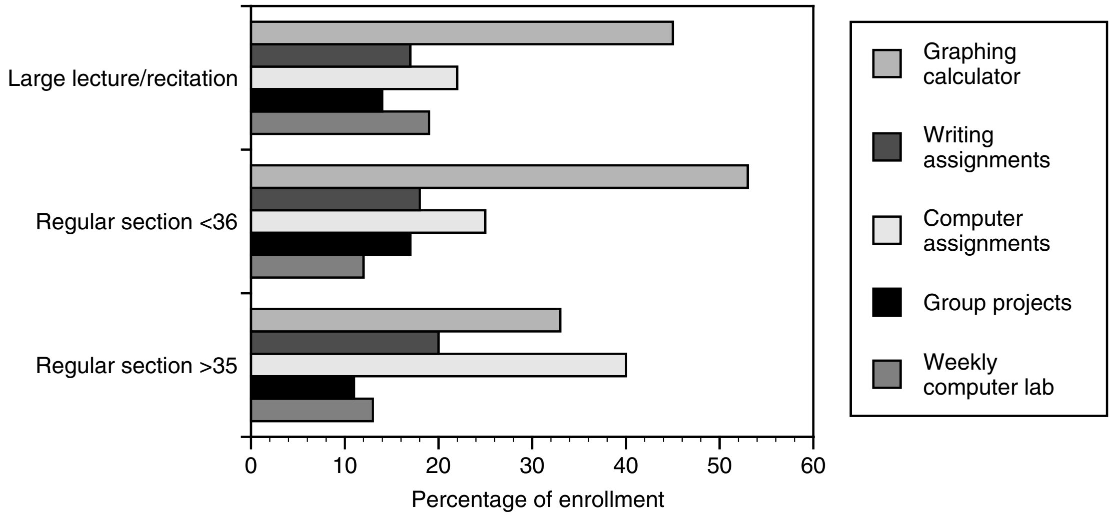

FIGURE SFY.20.3 Percentage of enrollment in Mainstream Calculus II taught using various reform methods in Mathematics Departments at four-year colleges and universities by size of sections: Fall 2000.

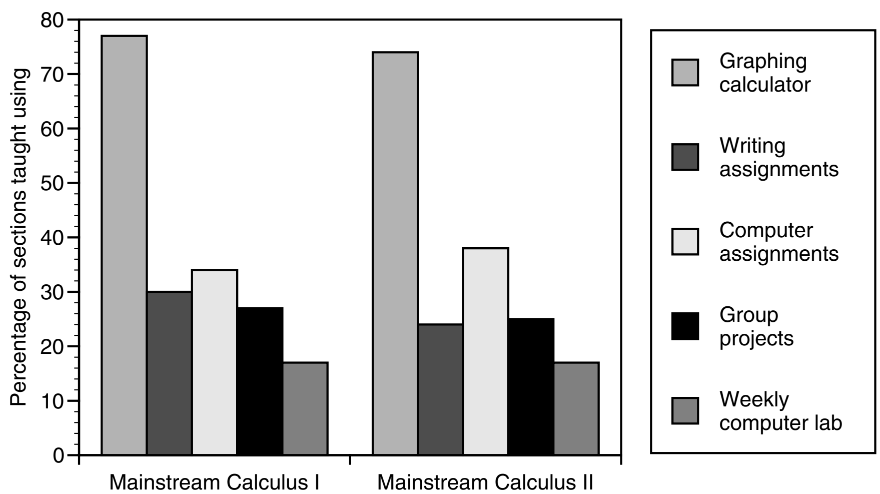

FIGURE SFY.20.4 Percentage of sections in Mainstream Calculus I and Mainstream Calculus II taught using various reform methods in Mathematics Programs at two-year colleges: Fall 2000.

TABLE SFY.21 AND SFY.22: NON-MAINSTREAM CALCULUS

A. Who Teaches Non-mainstream Calculus?

Table SFY.21 presents data on the percentage of enrollments in non-mainstream Calculus I and II taught by various types of instructors in three different instructional formats in four-year colleges and universities, and on the percentage of sections taught by full-time and part-time instructors in two-year college mathematics programs. (Recall that a calculus course is described as "non-mainstream" if it does not lead to upper division mathematics courses.) Like Tables SFY.18, and SFY.19, Table SFY.21 has an unknown instructor column that makes historical comparisons more difficult.

As with almost all other course categories studied so far, the percentage of non-mainstream Calculus I enrollment taught by tenured and tenure-eligible faculty in four-year colleges and universities declined between fall 1995 and fall 2000. Even in the unlikely event that all unknown instructors were in the tenured and tenure-eligible category, the total percentage of enrollment taught by tenured and tenure-eligible faculty dropped by at least nine percentage points from its 1995 level. Non-mainstream Calculus II provided a contrast: in that course the percentage of enrollment taught by tenured and tenure-eligible faculty rose, perhaps by as much as ten percentage points. In addition, as with most other courses studied, teaching by graduate students either declined or was unchanged from fall 1995 levels, depending upon how many of the unknown instructors were graduate students.

Two-year colleges saw the same pattern in non-mainstream calculus courses. The percentage of sections taught by full-time faculty declined in non-mainstream Calculus I, and rose substantially in non-mainstream Calculus II. However, as the enrollment data in Table SFY.21 show, the latter course is very small nationally.

Although still considerably smaller than mainstream Calculus I, the non-mainstream version of the course grew more rapidly in four-year colleges and universities, increasing by more than 8% between fall 1995 and fall 2000, while mainstream Calculus I decreased by about 1% during the same period. By contrast, in two-year colleges, non-mainstream Calculus I enrollment declined substantially between 1995 and 2000. Also, as was the case in 1995, average section sizes in non-mainstream Calculus I were larger than in mainstream Calculus I in each type of section. Comparing Table SFY.21 with the corresponding table (SFY.20) in the CBMS1995 report, one sees that the large lectures used in non-mainstream Calculus I got smaller, shrinking from an average of 106 students in 1995 to about 81 students in fall 2000.

B. How is Non-mainstream Calculus I Taught?

Table SFY.22 presents data on the extent to which various reform pedagogies have changed the way that non-mainstream Calculus I is taught. In four-year colleges and universities, the use of graphing calculators, writing assignments, computer assignments, and group projects in non-mainstream Calculus I increased between fall 1995 and fall 2000, with substantial growth in the use of graphing calculators and much less growth in the use of group projects. In two-year colleges, use of the first three reform pedagogies grew, while the use of group projects held steady at 20% of sections. The increase in graphing calculator use, from 44% of sections in 1995 to 72% in fall 2000, was particularly noteworthy. About one in sixteen students in non-mainstream Calculus I encountered the fifth teaching method — where students meet at least once each week in a situation that requires student computer use (abbreviated "weekly computer lab" in Table SFY.22). As can be seen by comparing Tables SFY.20 and SFY.22, the five reform pedagogies are more widely used in mainstream calculus than in non-mainstream calculus courses.

TABLE SFY.21 Percentage of enrollment in Non-Mainstream Calculus I and II taught by tenured/tenure-eligible, other full-time, part-time faculty, graduate teaching assistants, and unknown 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 two-year colleges: Fall 2000. Also total enrollments (in 1000s) and average section sizes.

	Percentage of enrollment taught by						
Four-Year Colleges & Universities	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Enrollment in 1000s	Average section size
Non-Mainstream Calculus I							
Large lecture/recitation	61	14	10	13	2	22	81
Regular section <36	39	19	23	15	4	44	27
Regular section >35	39	28	20	8	5	39	56
Course total 2000	44	21	19	12	4	105	40
Course total 1995	57	10	18	15	--	97	39
Non-Mainstream Calculus II							
Course total 2000	53	10	22	15	1	10	40
Course total 1995	44	11	18	26	--	14	35
Total Non-Mnstrm Calculus I & II 2000	44	20	19	12	5	115	40
Total Non-Mnstrm Calculus I & II 1995	55	10	18	16	--	111	38

	Percentage of sections taught by			
Two-Year Colleges	Full-time %	Part-time %		
Non-Mainstream Calculus I 2000	74	26	16	22
Non-Mainstream Calculus I 1995	77	23	26	26
Non-Mainstream Calculus II 2000	92	8	1	20
Non-Mainstream Calculus II 1995	63	37	1	19
Total Non-Mnstrm Calculus I & II 2000	76	24	17	22
Total Non-Mnstrm Calculus I & II 1995	76	24	27	26

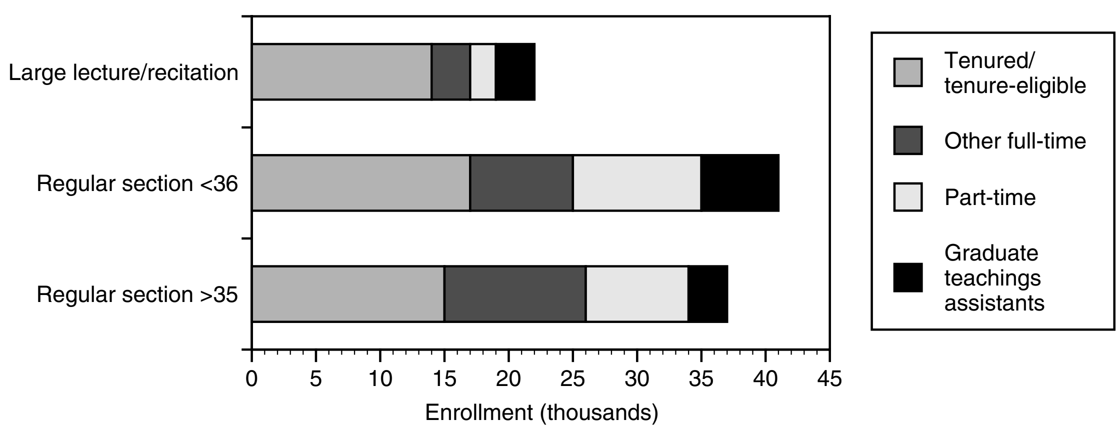

FIGURE SFY.21.1 Enrollment in Non-Mainstream Calculus I taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in Mathematics Departments at four-year colleges and universities by size of sections: Fall 2000.

TABLE SFY.22 Percentage of enrollment in Non-Mainstream Calculus I taught using various reform methods in Mathematics Departments at four-year colleges and universities by size of sections, and percentage of sections taught using various reform methods in Mathematics Programs at two-year colleges: Fall 2000. Also total enrollments (in 1000s) and average section sizes.

	Percentage of enrollment taught using						
Four-Year Colleges & Universities	Graphing calculators %	Writing assignments %	Computer assignments %	Group projects %	Weekly computer lab %	Enrollment in 1000s	Average section size
Non-Mainstream Calculus I							
Large lecture/recitation	27	12	7	5	1	22	81
Regular section <36	53	12	9	3	6	44	27
Regular section >35	46	17	22	16	0	39	56
Course total	45	14	13	9	3	105	40
1995 data	26	7	6	7	na	97	39
Two-Year Colleges	Percentage of sections						
Non-Mainstream Calculus I	72	20	15	20	6	16	22
1995 data	44	17	8	20	na	26	26

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

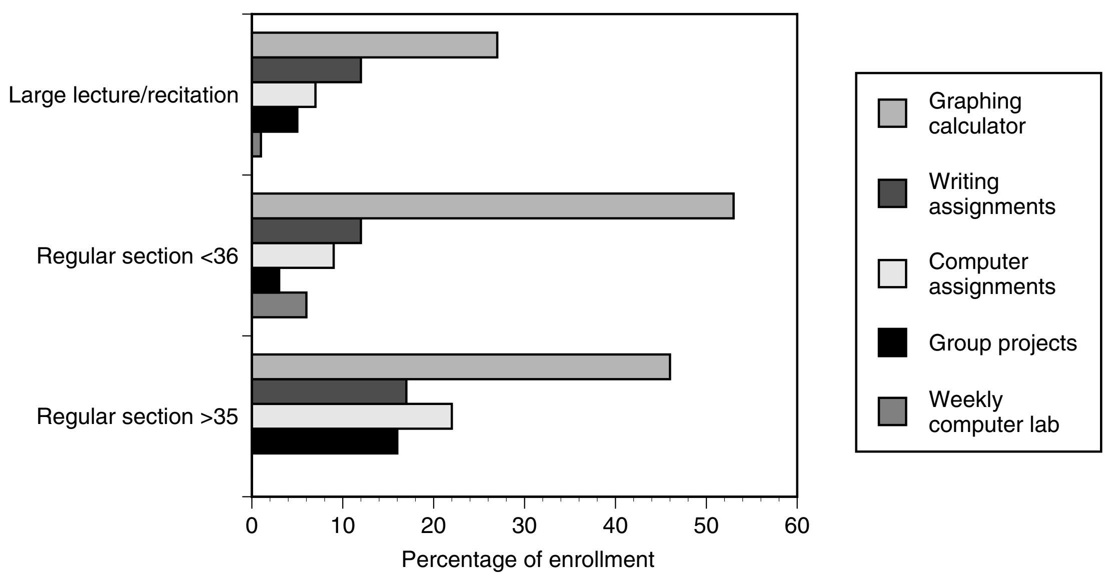

FIGURE SFY.22.1 Percentage of enrollment in Non-Mainstream Calculus I taught using various reform methods in Mathematics Departments at four-year colleges and universities by size of sections: Fall 2000.

TABLES SFY.23, SFY.24, AND SFY.25: TWO ELEMENTARY STATISTICS COURSES

These three tables present data on two first-year courses — Elementary Statistics, and Probability and Statistics, both with no calculus prerequisite. In addition to displaying enrollment and average section size figures for the courses, they answer the questions "Who teaches the courses?" and "How are the courses taught?" In comparing the figures in these three tables with, say, Table SE.3, it is important to realize the courses studied in these three tables are but two of the courses in the broader category that earlier tables called "elementary level statistics" in four-year colleges and universities. For a listing of courses within that broader category, see Appendix I or see the four-year mathematics and statistics questionnaires reproduced in Appendices IV and VI. In addition, Table SFY.25 is devoted entirely to the single Elementary Statistics course listed as course C1 in the four-year mathematics questionnaire, and as course B-1 in the four-year statistics questionnaire. For further study of these tables, see Tables FY.5 through FY.8 in Chapter 5. The corresponding tables in the CBMS1995 report are SFY.22 and SFY.23.

A. Enrollment and Section-Size Trends

In four-year colleges and universities, enrollments in the first-year course "Elementary Statistics" grew by about 18% between fall 1995 and 2000, and accounted for nearly all of the enrollments in the elementary statistics category (see Table SE.3). As shown in Tables SFY.23 and SFY.24, fall 2000 enrollments in the first-year course "Probability and Statistics" dropped by about 28% from fall 1995 levels in mathematics departments, and that second course is quite small compared to the first.

Table SFY.23 corrects an addition error in the corresponding table (SFY.22) from the 1995 report appearing in the Enrollment Total column for the Elementary Statistics course, and for the combination of the two courses studied in the table.

Table SFY.24 shows that in statistics departments, enrollments in the first-year Elementary Statistics course also grew between 1995 and 2000, but at a slower rate than in mathematics departments, and that enrollments in the first-year Probability and Statistics course dropped to half of their already relatively small 1995 level.

In two-year colleges, enrollment in Elementary Statistics (with or without Probability) grew by about 3% between fall 1995 and fall 2000.

Average section sizes in the Elementary Statistics course grew by about 27% between 1995 and 2000 in both mathematics and statistics departments, with average section sizes in statistics departments continuing to be substantially larger than in mathematics departments. Average section sizes in two-year colleges declined during the same period.

B. Who Teaches the Two Courses?

Tables SFY.23 and SFY.24 describe the percentage of fall 2000 enrollments in four-year colleges and universities that were taught by various types of instructors, and the percentage of *sections* in two-year colleges that were taught by full-time (permanent and temporary) and part-time instructors.

If one ignores the unknown instructor column, one sees a substantial drop in the percentage of enrollment in the Elementary Statistics course in mathematics departments that was taught by tenured and tenure-eligible faculty. Indeed, there was a fourteen point decrease in the percentage of Elementary Statistics course enrollment taught by full-time faculty of any type (tenured, tenure-eligible, or other full-time faculty) in mathematics departments. The same general trend was found in statistics departments — for example, there was a nine percentage point drop between fall 1995 and fall 2000 in the percentage of enrollment in the Elementary Statistics course that was taught by full-time faculty of any kind. In two-year college mathematics programs, there was also a decline in the percentage of sections taught by full-time faculty, but it was much smaller. In the Elementary Statistics course in four-year colleges and universities, the percentage of enrollment taught by graduate teaching assistants declined. In mathematics departments, the change was marginal, and in statistics departments the decline was large. In both kinds of departments, the percentages taught by other full-time and part-time faculty rose.

If one takes the unknown instructor percentages into account, the picture becomes murkier. Even if all unknown instructors were tenured or tenure-eligible, the percentage of enrollments taught by tenured and tenure-eligible instructors still declined, but by a lesser amount than mentioned above. The percentage of enrollment taught by other full-time and part-time instructors rose, no matter who the unknown instructors were, and might have risen sharply. In statistics departments, the percentage of enrollment in the Elementary Statistics course taught by graduate students declined somewhat. In mathematics departments, taking the unknown instructor percentages into consideration makes it unclear whether the level of teaching by graduate students in the Elementary Statistics course rose or fell between fall 1995 and fall 2000.

C. How is the Elementary Statistics Course Taught?

Table SFY.25 focuses on the extent to which the five calculus reform pedagogies studied in Tables SFY.20 and SFY.22 have influenced the teaching of the first-year Elementary Statistics course in mathematics and statistics departments of four-year colleges and universities, and in mathematics programs of two-year colleges. It has no antecedent in the CBMS1995 report, although that report did present information about the use of computer assignments in 1995 Tables SFY.22 and SFY.23. For more detailed information, see tables FY.6 and FY.8 in Chapter 5 of this report.

The use of computer assignments in teaching the Elementary Statistics course declined slightly in four-year mathematics departments and in two-year mathematics programs between 1995 and 2000, and increased slightly in four-year statistics departments. Table SFY.25 makes it clear that statistics department faculty saw computer assignments and "meeting at least once each week in a setting that requires student computer use" (abbreviated "weekly computer lab" in Table SFY.25) as being considerably more important in the Elementary Statistics course than did their colleagues in mathematics departments. Three other reform pedagogies — graphing calculators, writing assignments, and group projects — were more frequently used in mathematics departments. Two-year college mathematics programs generally agreed more with four-year mathematics departments than with statistics departments when it came to the use of reform pedagogies. Of all three types of departments, two-year mathematics programs were the most likely to use graphing calculators, writing assignments, and group projects.

TABLE SFY.23 Percentage of enrollment in Elementary Statistics (no Calculus prerequisite) and Probability and Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible, other full-time, part-time, graduate teaching assistants, and unknown in Mathematics Departments at four-year colleges and universities by size of sections, and percentage of sections in Elementary Statistics (with or without Probability) taught by full-time and part-time faculty in Mathematics Programs at two-year colleges: Fall 2000. Also total enrollments (in 1000s) and average section sizes.

	Percentage of enrollment taught by						
Mathematics Departments	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Enrollment in 1000s	Average section size
Elementary Statistics (no calculus prerequisite)							
Large lecture/recitation	47	9	17	14	13	25	41
Regular section <36	47	15	29	3	6	63	27
Regular section >35	40	19	19	10	12	26	47
Course total 2000	45	13	24	7	11	114	42
Course total 1995	65	7	19	8	--	97	33
Probability & Statistics (no calculus prerequisite)							
Course total 2000	50	28	23	0	0	13	25
Course total 1995	61	6	15	19	--	18	31
Total Elem. Probability & Statistics courses	46	14	24	6	10	127	25
Two course total 1995	64	7	18	10	--	115	33

	Percentage of sections taught by			
Two-Year Colleges	Full-time %	Part-time %	Enrollment in 1000s	Average section size
Elementary Statistics (with or without probability)	66	34	71	25
Course total 1995	69	31	69	28

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

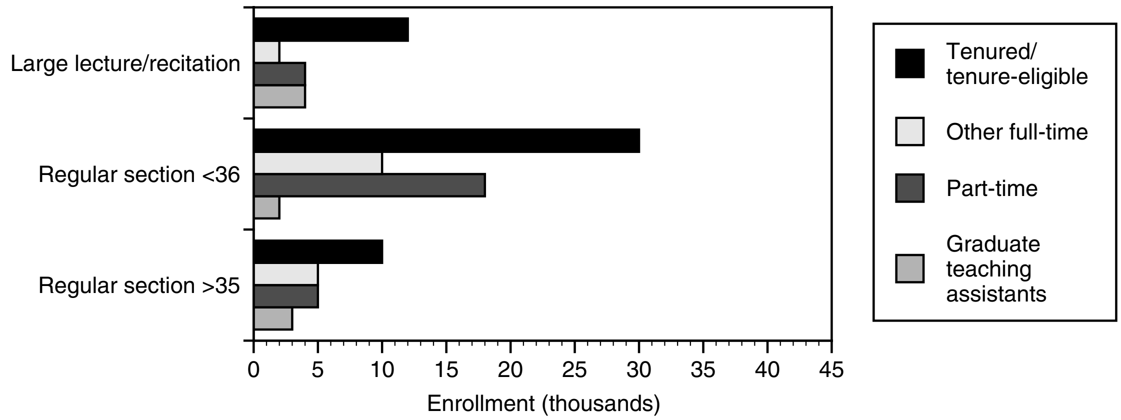

FIGURE SFY.23.1 Enrollment in Elementary Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in Mathematics Departments at four-year colleges and universities by size of sections: Fall 2000.

TABLE SFY.24 Percentage of enrollment in Elementary Statistics (no Calculus prerequisite) and Probability and Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible, other full-time, part-time faculty, graduate teaching assistants, and unknown in Statistics Departments at four-year colleges and universities by size of sections: Fall 2000. Also total enrollments (in 1000s) and average section sizes.

	Percentage of enrollment taught by						
Statistics Departments	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Unknown %	Enrollment in 1000s	Average section size
Elementary Statistics (no calculus prerequisite)							
Large lecture/recitation	38	19	24	15	4	31	65
Regular section <36	50	6	9	30	5	1	28
Regular section >35	23	8	16	36	17	7	47
Course total 2000	36	17	22	19	6	40	65
Course total 1995	47	15	10	29	--	35	51
Probability & Statistics (no calculus prerequisite)							
Course total 2000	18	12	13	32	25	4	55
Course total 1995	32	4	2	61	--	8	48
Total Elem. Probability & Statistics courses 2000	34	17	21	21	7	44	58
Two course total 1995	44	13	9	35	--	43	50

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

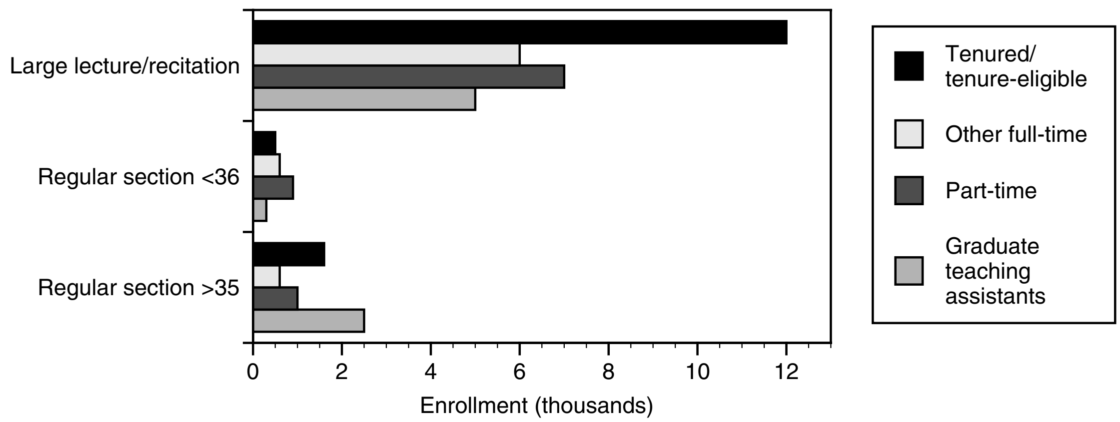

FIGURE SFY.24.1 Enrollment in Elementary Statistics (no Calculus prerequisite) taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in Statistics Departments at four-year colleges and universities by size of sections: Fall 2000.

TABLE SFY.25 Percentage of enrollment in Elementary Statistics (no Calculus prerequisite) taught using various reform methods in Mathematics Departments and Statistics Departments in four-year colleges and universities, and percentage of sections in Mathematics Programs at two-year colleges taught using various reform methods: Fall 2000. Also total enrollment (in 1000s) and average section sizes.

	Percentage of enrollment taught using						
Elementary Statistics	Graphing calculators %	Writing assignments %	Computer assignments %	Group projects %	Weekly computer lab %	Enrollment in 1000s	Average section size
Mathematics Departments							
Large lecture/recitation	40	47	61	27	42	25	41
Regular section <36	48	42	54	25	20	63	27
Regular section >35	52	22	23	10	13	26	47
Course total 2000	47	39	48	22	23	114	42
Course total 1995	na	na	51	na	na	95	33
Statistics Departments							
Large lecture/recitation	14	22	62	16	47	31	65
Regular section <36	4	24	54	13	19	1	27
Regular section >35	12	26	74	17	32	7	47
Course total 2000	13	23	63	16	43	40	65
Course total 1995	na	na	59	na	na	35	51
Two-year colleges							
Course total 2000	59	50	46	35	28	71	25
Course total 1995	na	na	46	na	na	69	28

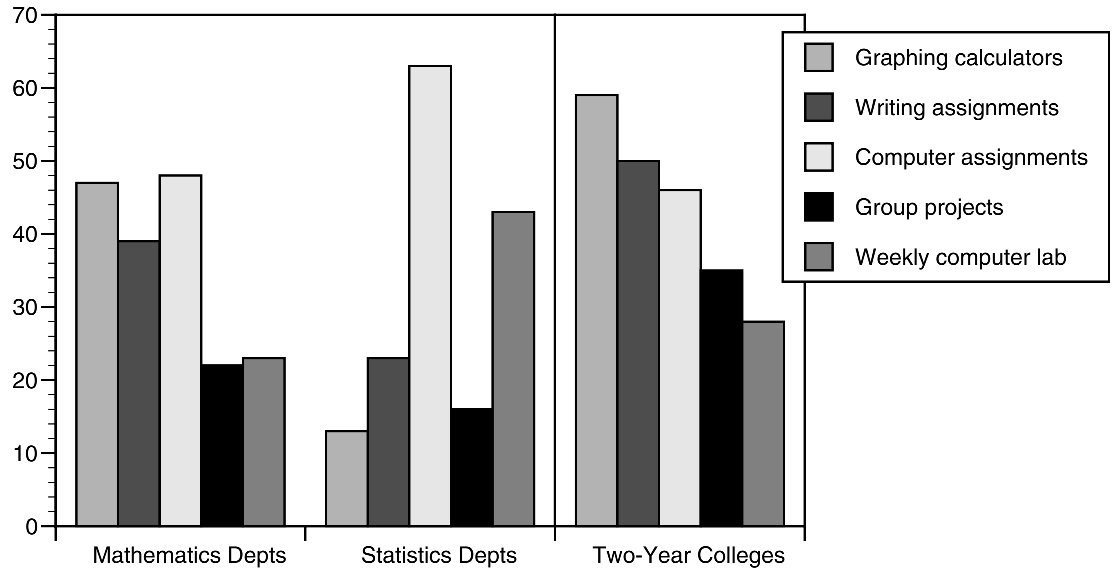

FIGURE SFY.25.1 Percentage of enrollments in four-year colleges and universities, and percentage of sections in two-year colleges, in Elementary Statistics (no Calculus prerequisite) taught using various reform methods: Fall 2000.

Chapter 2

Summary of CBMS2000 Special Topics

In addition to continuing the longitudinal studies of the mathematical sciences curriculum and faculty that started in 1965, each CBMS survey selects several special topics for investigation. The choice of special topics for the CBMS2000 survey began in 1999 when the CBMS2000 Steering Committee asked numerous professional society committees to suggest topics that were particularly timely.

One of the special topics chosen was to continue the CBMS1995 study of the spread of calculus reform. Those results are discussed in Chapters 1 and 5 of this report. Other special topics chosen by the CBMS2000 Steering Committee were:

a) pre-service education of K–8 teachers in mathematics and statistics;

b) academic resources for students: placement tests, tutoring centers, and special opportunities for mathematics students;

c) distance learning in the mathematical sciences;

d) dual-enrollment courses;

e) the educational background of faculty who teach statistics courses in four-year colleges and universities, and the impact of the statistics Advanced Placement examination.

This chapter presents twenty tables that summarize the findings of the CBMS2000 survey on those topics.

A. Pre-service Education of K–8 Teachers in the Mathematical Sciences

A recent CBMS-sponsored study [The Mathematical Education of Teachers, Vol. 11 in the *CBMS Issues In Mathematics Education Series*, Amer. Math. Soc., Providence, RI, 2001] made recommendations about appropriate mathematical education of pre-service K–8 teachers, i.e., undergraduates who are preparing to be teachers in one or more of the grades between kindergarten and eighth grades. The study recommended increased cooperation between mathematical sciences departments and schools of education in the design of courses for these students. The study also recommended that students preparing for early grades teaching take at least 9 semester hours of mathematics courses, and that students preparing for later grades teaching have at least 21 semester hours of mathematics courses. In addition, the report gave specific recommendations about the mathematical content of the 9–21 hours.

At the request of various professional society committees, the CBMS2000 survey included a study of the mathematical sciences education of pre-service K–8 teachers, and the next six tables summarize CBMS2000 findings. These findings can be seen as partial benchmarks against which future progress toward the recommendations of the above-cited report can be compared.

Typically there were at least two kinds of K–8 teacher preparation tracks in fall 2000, corresponding to the different kinds of teaching certificates issued by a given state. In almost all cases, one track dealt with early grades and included grades K–3, while another prepared teachers for later grades. Depending upon the system in a given state, the later grades might be 5 through 8, or 4 through 6, or 5 through 7. However, in almost all states, the later grades certification includes at least grades 5 and 6. Consequently, CBMS2000 asked surveyed departments to respond separately concerning students preparing to teach in the early grades (including K–3) and in later grades, which were defined as the block of grades including grades 5 and 6.

Table PSE.1 shows that in fall 2000, not all mathematics departments and statistics departments resided in institutions that offered teacher certification for some or all of grades K–8. For example, less than three quarters of the universities that contain doctoral mathematics or doctoral statistics departments were reported as offering K–8 certification.

TABLE PSE.1 Percentage of Mathematics Departments and Statistics Departments whose institutions offer a certification program for some or all of grades K–8, by type of school: Fall 2000.

	Percentage whose institutions have a K-8 teacher certification program
Mathematics Departments	
Univ (PhD)	72
Univ (MA)	87
Coll (BA)	85
Total Math Depts	84
Statistics Departments	
Univ (PhD)	58
Univ (MA)	63
Total Stat Depts	58

One way to assess the level of cooperation between mathematics departments and schools of education in pre-service teacher education is to consider the extent to which mathematics departments share in the governance of teacher certification programs. If one considers only mathematics departments whose universities had K–8 teacher certification programs in fall 2000, one finds that sixty to seventy-five percent of mathematics departments had a department member serving on the committee or in the office in charge of the program.

The *Mathematical Education of Teachers* report cited above argues that all K–8 teachers need special insight into K–8 mathematics, and mentions topics that are not found in most standard college mathematics courses except possibly for a special course or course sequence for pre-service teachers. CBMS2000 found that more than seventy percent of mathematics departments offered a special course or course sequence designed for some or all pre-service K–8 teachers, and we estimate that there were about 68,000 students enrolled in such courses at four-year colleges and universities in fall 2000, up 15% from the corresponding enrollment in fall 1995 (see Appendix I). In addition to courses designed exclusively for pre-service K–8 teachers, we found that a few mathematics departments also designated special sections of other courses as being especially for K-8 teachers. CBMS2000 data show that statistics departments were far less likely to be involved in K–8 teacher preparation in these ways. Details appear in Table PSE.2.

TABLE PSE.2 Percentage of departments in universities and colleges offering K-8 certification programs that are involved in K–8 teacher certification in various ways, by type of school: Fall 2000.

	Percentage of departments in schools offering K–8 certification programs that		
	Have a department member on the certification program's control committee	Offer a special course or course sequence for K-8 teachers	Designate special sections of regular courses for K-8 teachers
Mathematics Departments			
Univ (PhD)	63	79	11
Univ (MA)	74	92	13
Coll (BA)	68	73	4
Total Math Depts	69	77	7
Statistics Departments			
Univ (PhD)	0	4	0
Univ (MA)	0	0	0
Total Stat Depts	0	4	0

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

Although they do not offer teacher certification credentials, two-year colleges do offer courses that are part of the pre-service education of K–8 teachers. About half of all two-year colleges offered a course for pre-service K–8 teachers at some point during the 1999–2000 or 2000–2001 academic years, and we estimate that total enrollment in these courses in the fall of 2000 was about 16,900 students.

TABLE PSE.3 Percentage of two-year colleges that are involved with K–8 teacher preparation in various ways: Fall 2000.

Percentage of two-year colleges that	
Assign a faculty member to coordinate K–8 teacher education	22
Offered a course for preservice K–8 teachers in 1999–2000 or 2000–01	49
Designate special sections of other courses as especially for teachers	15

In order to be certified as a teacher in some or all of grades K–8 in fall 2000, how many mathematics courses, including general education courses, were pre-service K–8 teachers required to take? CBMS2000 data show that in those colleges and universities that offered K–8 certification programs, prospective K–3 teachers were required to take an average of 2.4 mathematics department courses during their undergraduate studies (including required general education courses, if any). Students preparing for later grades teaching were required to take an average of 3.0 mathematics department courses. There was some variation between the mathematical education of pre-service K–8 teachers based on the highest degree offered by the mathematics department. For example, in universities with masters level mathematics departments, the average number of courses required for early grades certification was 3.3 courses, while the average number required for later grades was 4.1. In universities with doctoral mathematics departments, the average number of mathematics courses required for K–3 certification was 2.2 and the average number required for the later grades was 2.5. By way of contrast, the national average of the number of statistics department courses required for pre-service K–8 teachers was so low that it rounded to zero.

Table PSE.4 also shows that in fall 2000 there was considerable variation among colleges and universities in terms of the number of mathematics department courses required for K–8 certification. For example, 8% required no mathematics department courses for K–3 certification, and 6% required five or more courses. For later grades certification, 7% required no mathematics department courses, while 18% required five or more courses in the mathematics department.

TABLE PSE.4 Percentage of four-year colleges and universities that require various numbers of Mathematics Department courses for early grades (K–3) certification and for later grades (including 5 and 6) certification, among colleges and universities offering certification programs. Also the average number of Mathematics Department courses required for various teacher certifications in those colleges and universities offering K–8 certification programs, by certification level and type of school: Fall 2000.

	Percentage requiring various numbers of Mathematics Department courses for	
Number of Mathematics courses required for certification	Early grades certification	Later grades certification
0 required courses	8%	7%
1 required course	17%	12%
2 required courses	45%	42%
3 required courses	14%	12%
4 required courses	11%	10%
5 or more required	6%	18%
Type of Mathematics Department	Average number of Mathematics courses required	Average number of Mathematics courses
Univ (PhD)	2.2	2.5
Univ (MA)	3.3	4.1
Coll (BA)	2.3	2.8
Overall Mathematics Depts	2.4	3

Which mathematics department courses were most likely to be taken by pre-service K–8 teachers? CBMS2000 asked mathematics departments to identify the three courses (from a list of eleven possibilities) that were most likely to be taken by pre-service teachers preparing for the K–3 classroom, and the three courses most likely to be taken by students preparing for teaching in later grades. For prospective K–3 teachers, the four courses most frequently mentioned were a multi-term course designed for elementary education majors (48%), followed by College Algebra (42%), Mathematics for Liberal Arts (39%) and a single-term course designed for elementary education students (32%). For students seeking certification in later grades, there was a wider variety of responses. Most frequently chosen were a multi-term course designed for elementary education students (46%), followed by College Algebra (34%), Liberal Arts Mathematics (33%) and a calculus course (29%). Because counting pre-service teachers enrolled in various courses is difficult, it is likely that these figures represent opinions of survey respondents rather than actual enrollment counts of pre-service teachers' curricular choices.

TABLE PSE.5 Percentages of Mathematics Departments identifying a given course as one of the three Mathematics courses most likely to be taken by pre-service teachers preparing for K–3 teaching or for later grades teaching (including 5 and 6), by type of department: Fall 2000.

	Most likely for K–3 certification				Most likely for later grades certification			
Mathematics Departments	Univ (PhD) Math	Univ (MA) Math	Coll (BA) Math	Total Math Depts	Univ (PhD) Math	Univ (MA) Math	Coll (BA) Math	Total Math Depts
Multi-term course for elementary education majors	48	36	51	48	49	41	47	46
Single term course for elementary education majors	39	53	26	32	31	39	23	27
College algebra	49	56	38	42	42	37	32	34
Pre-calculus	14	9	15	14	13	16	23	21
Intro to mathematical modeling	4	2	4	4	7	2	6	5
Mathematics for liberal arts	23	42	41	39	23	23	36	33
Finite mathematics	13	13	23	20	16	12	22	20
Mathematics history	8	7	4	5	13	25	5	9
Calculus	10	9	20	17	24	14	34	29
Geometry	10	18	6	8	18	23	15	17
Elementary Statistics	30	10	32	28	30	14	31	28

The extent to which statistics department courses were part of pre-service K–8 education in fall 2000 was less clear: recall that almost no statistics department courses were required for pre-service K–8 teachers. However, when asked which three statistics department courses were most likely to be taken by pre-service K–8 teachers, departments responded that the Elementary Statistics course with no calculus prerequisite was by far the most likely. A distant second was the department's Statistical Literacy course, followed by a single term statistics course designed for elementary education students. This data is confirmed by Appendix I which shows that total enrollment in the latter two courses is very small nationally.

TABLE PSE.6 Percentages of Statistics Departments identifying a given course as being one of the three Statistics courses most likely to be taken by pre-service teachers preparing for K–3 teaching or for later grades teaching (including 5 and 6), by type of department: Fall 2000.

	Most likely for K–3 certification			Most likely for later grades certification		
Statistics Departments	Univ (PhD) Stat	Univ (MA) Stat	Total Stat Depts	Univ (PhD) Stat	Univ (MA) Stat	Total Stat Depts
Multi-term course for elementary education majors	6	0	5	6	0	5
Single term course for elementary education majors	28	20	26	21	20	21
Elementary Statistics	69	40	63	75	40	68
Probability & Statistics	20	0	16	10	0	8
Statistics literacy	36	20	33	31	20	29

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

B. Academic Resources for Students: Placement Tests, Tutoring Labs, and Special Opportunities for Mathematics Students

This section of Chapter 2 continues the study of academic resources available to students in the mathematics and statistics departments and programs of two- and four-year colleges and universities that was initiated in CBMS1995.

Placement testing is somewhat different in two-year and four-year institutions. In four-year colleges and universities, it is relatively easy to identify the incoming students for whom placement or diagnostic testing may be important: they are each fall's entering freshmen class. In the two-year college world, identifying students who should take placement tests, and administering the tests, are more challenging. Many students enter a given two-year college already having considerable academic credit from another institution, and many enroll at the very last minute. As a result, the CBMS2000 survey asked slightly different questions of two- and four-year departments and programs. Both were asked whether they offered mathematics (or statistics) placement tests for entering students. Two-year programs were then asked whether the tests were usually required for first-time enrollees, while four-year departments were asked whether their placement test was required for entering freshmen.

Table AR.7 makes it clear that in fall 2000, placement testing was almost universally available in two-year colleges, and that it was usually required for first-time enrollees in almost all two-year colleges. Mathematics departments in four-year colleges and universities used mathematics placement testing to a somewhat lesser extent, with bachelors level departments offering (and requiring) it least of all. Nine out of ten statistics departments were not involved in placement testing.

What happened after the placement tests? Among the two-year colleges that offer placement testing, more than three quarters required entering students to meet with an advisor to discuss the results. In four-year mathematics departments, about three-fifths required students to discuss results with an advisor, and in the few statistics departments that offer placement testing, the corresponding percentage was about 50%. In about two thirds of two-year colleges, placement testing led to mandatory placement in the entering student's first mathematics course. The corresponding percentage in four-year departments was noticeably lower.

TABLE AR.7 Percentage of Mathematics Programs in two-year colleges, Mathematics Departments, and Statistics Departments that offer or require Mathematics or Statistics placement tests for first-time enrollees, by type of school: Fall 2000.

	Percentage of programs/departments that offer placement tests	Percentage of programs/departments that require placement tests of first-time enrollees
Two-Year College Mathematics Programs	98	98
Mathematics Departments		
Univ (PhD)	81	56
Univ (MA)	83	58
Coll (BA)	66	45
Overall Mathematics Depts	70	49
Statistics Departments		
Univ (PhD)	11	2
Univ (MA)	0	0
Overall Statistics Depts	9	2

TABLE AR.8 Percentage of Mathematics Programs in two-year colleges, Mathematics Departments, and Statistics Departments offering placement tests for first-time enrollees that require advising or mandate placement, and that periodically assess the effectiveness of their tests, by type of school: Fall 2000.

	Of Departments and Programs that offer placement tests		
	Percentage in which students must discuss results with advisor	Percentage in which placement tests lead to mandatory placement	Percentage that periodically assess the effectiveness of the tests
Two-Year College Mathematics Programs	79	67	85
Mathematics Departments			
Univ (PhD)	54	43	91
Univ (MA)	60	57	98
Coll (BA)	62	46	83
Overall Mathematics Depts	60	47	87
Statistics Departments			
Univ (PhD)	53	34	0
Univ (MA)	0	0	0
Overall Statistics Depts	53	34	0

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

Among two-year college mathematics programs, and among four-year mathematics departments that offered placement tests, the vast majority reported that they periodically assess the effectiveness of their tests.

Where do departments get the placement tests that they use? Table AR.9 shows that in fall 2000, two-year college programs obtained placement test materials from many different sources, with locally written tests being used almost everywhere, frequently combined with materials from outside vendors. In four-year mathematics departments, locally written tests were also used almost everywhere, but four-year departments relied on Mathematical Association of America (MAA) materials to a greater degree than did the mathematics programs of two-year colleges. (Percentages in columns of this table add to more than 100% because departments were asked to “check all sources used.”)

TABLE AR.9 Among Mathematics Programs in two-year colleges and Mathematics Departments in four-year colleges and universities that offer placement tests, the percentage of departments that obtain their placement tests from various sources: Fall 2000.

	Percentage of institutions using placement tests from various sources				
	Two-Year	Four-Year Mathematics			
Source of placement tests	Colleges	Univ (PhD)	Univ (MA)	Coll (BA)	Total
Written by department	99	100	100	100	100
Provided by ETS	30	6	5	2	3
Provided by ACT	34	14	21	12	14
Provided by MAA	3	21	39	18	23
Provided by other outside vendor	26	13	18	5	9

Note: In the CBMS2000 survey, departments were asked to "check all that apply" in a list of five potential sources of placement tests, and many checked several sources. Hence, the columns of AR.9 will not add to 100%.

Table AR.10 below describes the percentage of programs in two-year colleges, and in four-year mathematics departments and statistics departments, that operated a mathematics or statistics lab or tutoring center in fall 2000. In the two-year world, such academic support facilities were almost universally available. In four-year colleges and universities, nearly 90% of all four-year mathematics departments, and about 60% of statistics departments, offered such academic resources to students.

TABLE AR.10 Percentage of Mathematics Departments, Statistics Departments, and Mathematics Programs in two-year colleges that operate a lab or tutoring center in their discipline: Fall 2000.

Highest degree offered	Mathematics Departments	Statistics Departments	Two-Year College Mathematics Programs
Univ (PhD)	90	61	--
Univ (MA)	95	50	--
Coll (BA)	88	--	--
All departments	89	59	98
1995 data	na	na	93

What kinds of services are offered in mathematics and statistics labs and tutoring centers? Table AR.11 shows that in terms of the kinds of services offered in labs and tutoring centers, there was not much difference between four-year mathematics and statistics departments in fall 2000. Both emphasized computer software and tutoring by students in their tutoring centers, while other services were offered in a third or fewer of the departments. As Table AR.11 shows, there was a marked difference between the four-year and two-year worlds in terms of services available in labs and tutoring centers: except in the category "tutoring by students," labs and tutoring centers in two-year colleges were more elaborate than their counterparts in the four-year world.

TABLE AR.11 Percentage of Mathematics Departments, Statistics Departments, and Mathematics Programs in two-year colleges operating labs or tutoring centers that offer various services, by type of school: Fall 2000.

Services in labs & tutoring centers	Computer-aided instruction	Computer software	Media such as video tapes	Tutoring by students	Tutoring by para-professional staff	Tutoring by part-time faculty	Tutoring by full-time faculty	Internet resources
Mathematics Departments								
Univ (PhD)	37	59	23	97	39	30	31	42
Univ (MA)	40	70	33	98	28	21	15	39
Coll (BA)	39	60	22	100	36	16	13	30
Total Mathematics Departments	38	62	24	99	35	18	16	33
Statistics Departments								
Univ (PhD)	43	70	20	96	44	13	3	22
Univ (MA)	0	25	0	75	0	0	0	25
Total Statistics Departments	36	63	17	93	37	11	3	23
Two-Year College Mathematics Programs	68	69	74	96	68	48	42	53

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

Besides labs and tutoring centers, there are many other out-of-class academic support services and opportunities that departments can offer to their undergraduates. For examples, see Table AR.12 below. Among four-year mathematics departments in fall 2000, those offering doctoral degrees appeared to offer the widest, and bachelors level departments the smallest, range of academic opportunities for their majors. Two-year colleges offered a more restricted set of options for their mathematics students.

The entry for two-year colleges in the column "Assigned advisors in department" seems anomalous. First, it is not consistent with anecdotal evidence about advising practices in two-year colleges, and second, it represents a major decline from the percentage (65%) of two-year colleges that reported assigning advisors in the CBMS1995 survey ([CBMS1995, p. 100]). However, the data has been carefully checked, and CBMS2000 estimates that only 33% of two-year colleges assigned advisors in fall 2000. For further discussion, see the "Faculty

TABLE AR.12 Percentage of Mathematics Programs in two-year colleges, Mathematics Departments, and Statistics Departments that offer various kinds of special opportunities for undergraduates, by type of school: Fall 2000.

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, e.g., K–12 schools	Undergrad. research opps	Indep. studies opps	Assigned advisors in dept.
Two-Year College Mathematics Programs	20	14	4	4	28	9	20	4	25	33
Mathematics Departments										
Univ (PhD)	74	84	26	27	96	73	46	84	97	90
Univ (MA)	49	87	24	11	76	74	49	67	75	93
Coll (BA)	16	51	3	2	55	46	46	52	79	78
Total Math Depts	29	61	9	7	63	54	47	59	80	82
Statistics Departments										
Univ (PhD)	43	26	3	3	29	39	6	59	68	73
Univ (MA)	63	25	0	0	25	50	13	50	63	63
Total Stat Depts	46	25	2	2	28	41	7	58	67	71

Advisors" section of Chapter 6, associated with Table TYR.12.

C. Distance Learning in the Mathematical Sciences

Previous CBMS reports have investigated the extent to which mathematics programs in two-year colleges used computer-aided instruction and television to teach their courses. The CBMS2000 survey broadened that study, asking all departments about the extent to which they were using "distance learning" to teach sections of their courses. Distance learning was defined as follows: a section is taught by distance learning provided "at least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is NOT physically present." The tables in this section show the percentage of sections in various courses that were reported as taught using distance learning in two-year and four-year programs and departments in fall 2000. In almost all cases, the percentages were quite low. In the few cases where the percentage exceeded 10%, the course enrollment was a relatively small one (e.g., non-mainstream Calculus II in two-year colleges or Database Management Systems taught in bachelors-level mathematics departments) and the standard errors were large.

Mathematics programs at two-year colleges had well-developed distance learning activities in many parts of their mathematical sciences programs, as can be seen from Table DL.13 below. In two-year college mathematics programs, the mathematical sciences courses most frequently taught using distance learning were College Algebra (almost 7% of sections), non-mainstream Calculus II (19%), Mathematics for Liberal Arts (5%), and the Elementary Statistics course (almost 6%). Among computer science courses taught by two-year college mathematics programs, distance learning was used in about

TABLE DL.13 Percentage of sections in Mathematics Programs of two-year colleges taught via distance learning: Fall 2000.

Percentage of sections taught via distance learning methods in two-year colleges							
% of sections		% of sections		% of sections		% of sections	
Remedial level		**Calculus level**		**Other mathematics**		**Computing**	
Arithmetic/ Basic mathematics	0.7	Mainstream Calculus I	1.5	Linear algebra	3.7	Computers and society	0
Pre-algebra	1.5	Mainstream Calculus II	2.4	Discrete Mathematics	0	Introduction to software	6.5
Elementary algebra (HS level)	1.3	Mainstream Calculus III	1.1	Elementary Statistics	5.8	Issues in CS	0
Intermediate algebra (HS level)	1.8	Non-mnstrm Calculus I	3.1	Probability	2	Computer programming I	0
Geometry (HS level)	4.9	Non-mnstrm Calculus II	19.4	Finite mathematics	0.4	Computer programming II	3.3
Precalculus level		Differential equations	1.5	Math for liberal arts	5.5	Adv prog & data structures	0
College algebra (above Intermediate)	6.7			Math for elem school teachers	1.4	Database mgmt systems	6.3
Trigonometry	0.8			Business math[1]	4.9	Discrete math for CS	0
College algebra & trig (combined)	2.8			Business math[2]	0	Other CS	3.1
Intro mathematical modeling	0.9			Technical math[3]	0		
Precalculus/Elem functions	1.6			Other mathematics courses	4.7		

Note: 0 means less than one tenth of 1%.
[1] Not transferrable for credit toward Bachelors degree.
[2] Transferrable for credit toward Bachelors degree.
[3] A combination of courses C26 and C27 in the Two-Year Questionnaire. See Appendix V or Table TYR.3 in Chapter 6.

6% of sections in Introduction to Software Packages and in Database Systems.

Table DL.14 gives data on the percentage of sections of various courses in four-year colleges and universities that were taught using distance learning methods in fall 2000. In almost all mathematics courses, the percentage of sections taught by distance learning was below 2%, with Finite Mathematics (2.4%) and Trigonometry (3.2%) being exceptions. Among mathematics departments, doctoral departments were the most active in distance learning in fall 2000, teaching almost 5% of their Elementary Algebra sections and of their Intermediate Algebra sections via distance learning, and over 8% of their Trigonometry sections. In lower level computer science courses taught in mathematics departments, there was a greater proportion of courses in which at least 5% of sections were taught using distance learning methods. Over 6% of sections in Data Structures and in Database Management used distance learning, as did almost 5% of sections in Introduction to Software Packages. As noted earlier, the majority of computer science taught in mathematics departments is taught by bachelors and masters level departments, and it is masters level mathematics departments that teach the highest proportion of their computer science courses via distance learning. Bachelors level mathematics departments teach an exceptionally large percentage of their Database Management sections (almost a quarter) using distance learning methods.

TABLE DL.14 Percentage of sections of various courses taught via distance learning (= any method where at least half of the students receive the majority of their instruction in situations where the instructor is not physically present) in four-year college and university Mathematics Departments, by type of department: Fall 2000.

	Percentage of sections taught via distance learning in			
Courses	Univ (PhD)	Univ (MA)	Coll (BA)	All Math Depts
Remedial level				
Arithmetic	0	0	0	0
General mathematics (Basic skills)	0	0	0	0
Elementary algebra (HS level)	5.5	0	0	0.9
Intermediate algebra (HS level)	4.7	0.4	1.5	2
Other remedial level	0	0	1.9	1.4
Introductory level (incl. pre-Calculus)				
College algebra	1.9	1.6	0.5	1.3
Trigonometry	8.1	0	0	3.2
College algebra & trigonometry	0.5	0	0	0.1
Elementary functions & pre-calculus	1.6	0	0	0.4
Intro to mathematical modeling	0	0	0	0
Mathematics for liberal arts	2.9	0	1.7	1.2
Finite mathematics	2.3	0	3.4	2.4
Business mathematics	0	0	0	0
Math for elementary school teachers	5.8	0	0	1
Other introductory level courses	4	0	0	0.6

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

TABLE DL.14, Continued.

Courses	Percentage of sections taught via distance learning in Univ (PhD)	Univ (MA)	Coll (BA)	All Math Depts
Calculus level				
Mainstream Calculus I	0.9	0	0	0.3
Mainstream Calculus II	1.1	0	0	0.5
Mainstream Calculus III,IV	2	1.1	0	1.1
Non-mainstrm Calculus I	0.5	1.4	0	0.8
Non-mainstrm Calculus II	0	0	0	0
Differential equations	0.7	0	0	0.3
Discrete mathematics	0	0	0	0
Linear/Matrix algebra	0	0	0	0
Other Calculus level courses	0	0	0	0
Statistics courses				
Elementary statistics (no Calculus prerequisite)	4.3	2.1	0.5	1.6
Probability & Statistics (no Calculus prerequisite)	0	0	0	0
Other elementary level statistics	0	0	0	0
Computer Science courses				
Lower level				
Computers & society	0	0	0	0
Introduction to software packages	0	9.2	0	4.5
Issues in Computer Science	0	0	0	0
Computer programming I	0	2	0	0.6
Computer programming II	0	3.9	0	1.7
Advanced programming & data structures	0	15	7	6.6
Database management systems	0	0	23.8	17.2
Discrete mathematics for CS	0	0	0	0
Other lower level CS courses	0	10.1	0	4.7

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

Statistics departments offered very few of their courses by distance learning, the most frequently offered being Statistics Literacy.

TABLE DL.15 Percentage of sections taught via distance learning methods (= where at least half of the students receive the majority of their instruction in situations where the instructor is not physically present) in Statistics Departments by type of department: Fall 2000.

	Percentage of sections taught via distance learning in		
Statistics Departments	Univ (PhD)	Univ (MA)	All Stat depts
Elementary statistics (no Calculus prerequisite)	0.3	0	0.3
Probability & Statistics (no Calculus prerequisite)	0	0	0
Statistics literacy	4.5	0	3.3
Statistics for pre-service teachers	0	0	0
Other elementary level statistics	0	0	0

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

While it is easy to estimate the numbers and percentages of sections taught using distance learning, it is more difficult to estimate the number of students taught in these courses. (For a discussion of the statistical methodology used in making enrollment estimates, see Appendix II.) There is no reason, for example, to assume that the size of sections taught by distance learning was the same as the section size in courses taught on campus. Indeed, it is conceivable that a department might have assigned all distance-learning students in a given course to a single section, or that a department might have kept distance learning sections artificially small, because of the experimental nature of the program. To investigate distance learning more completely, future studies will need to separate total enrollment in distance learning sections from the enrollment in other sections of each course.

D. Dual Enrollment in Mathematical Science Courses

For many years, mathematically talented high school students have had options for obtaining college mathematics credit during their high school years. Performing well on national AP examinations was one option, and many well-prepared high school seniors were also able to enroll at local colleges and universities to take mathematics courses not offered in their high schools.

In the 1990s, new options for obtaining college credit during high school became increasingly available. Because many courses were taught in both high school and college, some colleges began offering credit for courses taught in high schools, often by high school teachers rather than by college faculty, and usually taught for simultaneous high school and college credit. Such courses came to be called “dual enrollment courses.”

In many states in the late 1990s, both the high school offering a dual enrollment course and the college granting college credit to students in that course received some degree of credit for enrollments in the course. Sometimes the credit received was in terms of increases in enrollment-generated budgets, and sometimes it was in terms of citations for local educational quality. Anecdotal evidence suggests that some students saw receiving college credit for high school courses as a way to enhance college admissions prospects, or to have more time for elective courses in college, or perhaps as a way to shorten the time spent in college. Finally, anecdotal evidence suggests that it may be easier to pass a high school course and thereby receive dual enrollment credit than to get a score of 3, 4, or 5 on the corresponding national AP exam. The combination of all these factors would seem to make the movement toward dual enrollment credit almost irresistible.

In fall 2000, two-year colleges were typically the post-secondary institutions that awarded dual enrollment credit. However, in many states, college credit awarded by any of the state’s public two-year colleges was, by law, transferable to four-year colleges within that state, so that dual enrollment programs also affected four-year colleges and universities. Some four-year institutions found that dual enrollment credit was beginning to compete with traditional Advanced Placement credit among entering freshmen.

Table DEN.16 shows that in fall 2000, nearly 15% of all College Algebra, Pre-calculus, and Calculus I sections offered by two-year colleges, and about 7% of the Elementary Statistics sections, were taught via dual enrollment.

TABLE DEN. 16 Number of sections of various courses offered by two-year colleges via dual enrollment in Spring and Fall, 2000, plus total number of sections of those courses: Fall 2000.

	Number of dual enrollment sections		
	Spring 2000	Fall 2000	Total Fall sections
College algebra	522	924	6619
Precalculus/Elementary functions	510	362	1991
Intro to Mathematical modeling	10	0	329
Calculus I	347	440	3026[1]
Elementary Statistics	179	190	2794

Note: 0 means less than 5 sections.
[1] Combination of mainstream and non-mainstream calculus sections offered Fall 2000.

To what extent did mathematics programs at two-year colleges control the dual enrollment courses for which they awarded credit? Table DEN.17 shows the percentages of two-year mathematics programs that reported different levels of control of various aspects of dual enrollment courses.

TABLE DEN.17 Percentages of two-year college Mathematics Programs that controlled various aspects of dual enrollment courses for which they award credit: Fall 2000.

Percentages of two-year Mathematics Programs that controlled the following aspects of dual enrollment courses			
	Never	Sometimes	Always
Choice of textbook	10	12	79
Design of syllabus	8	11	82
Design of final exam	15	28	57
Choice of instructor	19	20	61

To what extent were the instructors in dual enrollment courses expected to meet the same standards as other part-time faculty in two-year college mathematics programs? Table DEN.18 shows the percentage of mathematics programs in which dual enrollment instructors were required to have the same educational qualifications and to participate in the same teaching evaluation program as other part-time faculty.

TABLE DEN.18 Percentages of two-year college Mathematics Programs in which dual-credit instructors must meet the same credit hour and degree requirements as regular part-time faculty, and participate in the college's regular teaching evaluation program: Fall 2000.

Percentage of two-year colleges in which instructors of dual credit courses	
Must meet the same degree requirements as regular part-time faculty	92
Are included in the college's regular teaching evaluation program	67

What is the reaction of two-year college mathematics programs to the new wave of dual enrollment courses? The CBMS2000 survey included "dual enrollment courses" in a list of eighteen potential concerns for two-year college mathematics programs and asked respondents to rate the degree to which each was a problem. Table TYR.46 in Chapter 7 shows that only 8% of mathematics program heads cited dual enrollment as a major problem, while 77% saw it as a minor problem or no problem at all. Thus, in the eyes of mathematics program directors in two-year colleges, dual enrollment was not a pressing problem in fall 2000.

E. Special Statistical Topics in CBMS2000

Officers of the American Statistical Association proposed that CBMS2000 investigate two special statistics topics — the educational background of faculty members teaching statistics courses in fall 2000, and the impact of the new Statistics Advanced Placement (AP) program in university statistics departments. This subsection presents the findings.

Who Teaches Statistics in Four-Year Colleges and Universities?

Table ST.19 shows that in doctoral mathematics departments, almost 60% of statistics course instructors had at least a masters degree in statistics. In masters level mathematics departments, the corresponding percentage was over 40%, while in bachelors level departments, about one fifth of statistics course instructors had at least a masters degree in statistics. In statistics departments, the percentages were understandably higher.

TABLE ST.19 Percentage of instructors in Statistics courses who had doctoral degrees in Statistics or Biostatistics, or masters degrees but not doctoral degrees in Statistics or Biostatistics, by type of department: Fall 2000.

	Percentage of Fall 2000 Statistics instuctors who had the following degrees in Statistics		
	Statistics or Biostatistics PhD	Statistics or Biostatistics Masters only	Other degree or Unknown
Mathematics Departments			
Univ (PhD)	52	6	42
Univ (MA)	38	6	56
Coll (BA)	11	8	81
Statistics Departments			
Univ (PhD)	83	6	11
Univ (MA)	62	17	21

Another way to understand the educational backgrounds of faculty teaching statistics courses is to ask about the major fields of study for their highest earned degree. CBMS2000 phrased the question in those terms to take into account that a person might receive a doctoral degree from a mathematics department even though the person's dissertation was in statistics. Table ST.20 presents survey results on that question. As expected, the vast majority of statistics instructors held graduate degrees in either statistics or mathematics.

Tables E.3 to E.9 in Chapter 3 present data on the academic status (tenured or tenure-eligible, other full-time, part-time faculty, and graduate teaching assistants) of instructors in statistics courses. Tables FY.5 and FY.7 present more detailed information about who teaches first year statistics courses.

TABLE ST.20 Percentages of faculty teaching statistics courses and having various major fields for their highest earned degree, by type of department: Fall 2000.

	Percentages of Statistics instructors in Fall 2000 with various major fields for their highest earned degree				
Field of highest degree	Math Dept (PhD)	Math Dept (MA)	Math Dept (BA)	Stat Dept (PhD)	Stat Dept (MA)
Statistics PhD	50	36	11	82	56
Statistics MA only	6	6	7	5	15
Biostatistics PhD	2	2	0	1	6
Biostatistics MA only	0	0	1	1	2
Mathematics PhD	22	28	31	6	10
Mathematics MA only	6	12	18	0	2
Mathematics Education PhD	1	3	11	0	0
Mathematics Education MA only	1	1	8	0	0
Computer Science PhD	0	0	1	0	0
Computer Science MA only	0	1	0	0	0
Social Science PhD	0	0	2	1	2
Social Science MA only	0	0	0	0	0
Education PhD	0	0	0	0	0
Education MA only	0	0	1	0	0
Other PhD	6	7	2	1	2
Other MA only	2	1	2	0	2
Unknown	4	3	5	3	3

Note: 0 means less than half of 1%.

Impact of the Statistics Advanced Placement Examination in Statistics Departments

The CBMS2000 statistics questionnaire asked about changes in enrollments, curriculum, and the number of statistics majors in statistics departments that might grow out of the Statistics Advanced Placement (AP) program. Because the Statistics AP examination was not started until 1997, it might have been premature to ask such questions in fall 2000, but the resulting data can serve as a baseline for future studies.

CBMS2000 estimates that in fall 2000, 1,012 (SE = 230) students nationally received statistics department credit for an elementary level statistics course based on their Statistics AP examination performance. As can be seen from Table SE.3 in Chapter 1, that figure was slightly less than 2% of the total of all fall 2000 elementary level statistics enrollments in statistics departments. (To understand why that figure (1,012) is low compared to the almost 18,000 students who received grades of 3, 4, or 5 on the Statistics AP exam during 2000, recall that in fall 2000 there were fewer than 100 statistics departments in the U.S., and almost 1,400 mathematics departments. Consequently the numbers reported by statistics departments would not include the students from the vast majority of colleges.)

Concerning curricular changes, the CBMS2000 survey found that in fall 2000 no statistics department reported creating new courses because of the Statistics AP Program.

Given that the Statistics AP examination allows students to earn credit for the non-calculus, elementary statistics course, why would one ask about the relation between the Statistics AP program and the number of majors in statistics departments? Admittedly the linkage, if there is one, is indirect: the hoped-for linkage might grow out of enthusiasm for statistics generated by students' early exposure to the subject in AP classes.

Some statistics departments reported an increase in statistics majors since the 1997 inception of the Statistics AP program. In fall 2000, about 80% (SE 3.7) of statistics departments offered a bachelors degree in statistics (as well as teaching undergraduate statistics courses). Of statistics departments offering a bachelors degree, about 32% (SE 5.7) reported an increase in the number of their majors between 1997 and 2000, with 36% of doctoral statistics departments, and 17% of masters level statistics departments, reporting such growth. Reports of such increases may be particularly noteworthy given what appears to be a general decline in the number of statistics majors (in both statistics and mathematics departments) between 1995 and 2000. See the discussion of Table E.1 in Chapter 3 for more details.

Chapter 3

Enrollments in Four-Year Colleges and Universities

Data Highlights

The total number of bachelors degrees granted through the nation's mathematics departments did not change substantially between 1994–95 and 1999–2000 and remained below the levels of 1989–1990. Of the mathematical sciences bachelors degrees, only mathematics education increased substantially during the 1990s; others declined, often by large percentages. The number of undergraduate computer science degrees granted by U.S. mathematics departments rose from 1995 levels, but remained far below the levels of 1990. The percentage of mathematics bachelors degrees awarded to women held steady at the 42–43% range throughout the 1990s.

Overall fall enrollments in four-year mathematics departments rebounded from lows reached in 1995, and almost returned to the levels of fall 1990. Combined Fall 2000 enrollments in mainstream Calculus I and II were essentially the same as they were in 1995, and were down from the levels of 1990. Advanced mathematics course enrollments grew from 1995 levels, but remained below where they were in fall 1990. Computer science enrollments in mathematics departments climbed 24% from their 1995 lows, but still remained less than 69% of their 1990 levels (Table E.2).

Overall enrollments in statistics departments continued their decade-long rise and increased about 14% from 1995 levels, reaching a point that was about 70% above 1990 levels. At the same time, the national statistics department faculty decreased markedly from 1995 levels — see Chapter 4 — with the inevitable result that average section sizes in statistics departments grew (Table E.11).

There was a clear staffing shift between 1995 and 2000 in both mathematics and statistics departments. The percentage of students taught by tenured and tenure-eligible faculty was down, often markedly, in every course category except remedial courses where it rose marginally. The percentages of enrollments taught by "other full time faculty" (i.e., full time faculty who are not tenured and not tenure-eligible) and by part-time faculty were up noticeably. The percentage of enrollment taught by graduate student teaching assistants declined, often to a major degree.

Notes on the Tables

There are eighteen tables in this chapter. The early tables present data on degrees granted and enrollments in different kinds of courses in various types of departments. Tables E.3 through E.9 focus on the question "Who teaches undergraduates?" as measured by percentages of enrollments. The final tables in the chapter present data on numbers of sections, rather than percentages of enrollment, another way to investigate the teaching effort of mathematics and statistics departments in the undergraduate mathematical and computer sciences. For a list of the courses in course categories (such as remedial, introductory, and calculus level) that are used in this chapter, see Appendix I.

In the CBMS2000 questionnaires, departments were asked to subdivide their fall 2000 sections based upon the nature of the instructor. Four instructor categories were used — tenured and tenure-eligible, other full time (e.g., non-tenure track full-time instructors, one year visitors, and postdocs), part-time faculty, and graduate teaching assistants. Because some departments did not give complete data on who taught the department's courses, many of the tables in this chapter have a category labeled "Unknown Instructor" that sometimes is of double digit size. This makes some historical comparisons problematic.

More detailed enrollment information on first-year calculus courses of various kinds and on first-year elementary statistics can be found in Chapter 5.

TABLE E.1: Number of Mathematical Sciences Bachelors Degrees

This table is an elaboration of Table SE.4 in Chapter 1.

A. Total Number of Majors

The total number of bachelors degrees granted by mathematics departments between July 1, 1999 and June 30, 2000 (22,220 with SE = 2165) was roughly the same as the number awarded between July 1, 1994 and June 30, 1995 (22,334, as reported in Table E.1 of [CBMS1995]). However, individual components of that total changed. For example, the number of bachelors degrees awarded by mathematics departments in computer science was up by 21% from 1995 levels and the number of bachelors degrees in statistics was down by almost 50% between 1995 and 2000. (That 50% decline seems anomalous, but it is what CBMS2000 data show.) Mathematics education bachelors degrees were up slightly from 1995 levels. Statistics departments also experienced a large decline, of about 30%, from the number of statistics bachelors degrees awarded in 1995.

Compared to findings of the 1990 CBMS survey (Tables E.5 and E.6 in [CBMS1990]), CBMS2000 data show a roughly 5% decline in the number of bachelors degrees awarded by mathematics departments over the decade. That 5% decline includes a 35% drop in the number of computer science degrees, partially offset by an increase of about 3% in the number of mathematical sciences bachelors degrees. Within the mathematical sciences degree category, mathematics education was the only degree that was given in greater numbers in 2000 than in 1990, the increase being about 60% with most of the growth occurring during the first half of the decade. Other mathematical sciences degrees awarded by mathematics departments declined, dropping 8% in the mathematics major and 25% in the statistics major. Statistics departments, by contrast, saw a 16% increase in the number of bachelors degrees that they awarded between 1990 and 2000 ([CBMS1990, p.30]).

B. Bachelors Degrees Granted to Women

The CBMS2000 survey did not detect any major changes between 1995 and 2000 in the percentage of bachelors degrees awarded to women by mathematics departments. The 43% figure found by CBMS2000 is very close to the 42% figure in CBMS1995. However, there did appear to be gender shifts within some components of the overall degrees awarded. For example, in 1995, 49% of mathematics education bachelors degrees went to women, while in 2000 the percentage was 59%. The same rise (from 49% to 59% female) also occurred among statistics bachelors degrees awarded by mathematics departments, and the percentage of women among computer science majors in mathematics departments increased from 22% in 1995 to 24% in 2000. In the much larger group of mathematics majors, the period from 1995 to 2000 saw a slight decline in the percentage of bachelors degrees granted to women. On the other hand, statistics departments experienced an increase from 38% to 43% in the percentage of bachelors degrees awarded to women during the same five year period.

If one compares CBMS2000 data to the findings of the CBMS survey in 1990, one sees essentially no change in the percentage of bachelors degrees awarded to women. However, definite gender shifts occurred in some majors offered by mathematics departments. For example, over the decade both mathematics education and computer science experienced declines of at least five percentage points in the percentage of degrees awarded to women, while the percentage of statistics degrees awarded (by mathematics departments) to women rose sharply, from 32% to 59%. During the decade of the 1990s, the percentage of bachelors degrees awarded to women by statistics departments rose by five percentage points, holding steady at 38% from 1990 to 1995, and then increasing to 43% in 2000.

TABLE E.1 Bachelors degrees in Mathematics, Mathematics Education, Statistics, and Computer Science in Mathematics Departments and in Statistics Departments awarded between July 1, 1999, and June 30, 2000, by gender of degree recipient and type of school.

	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	2851	1340	3742	**7933**				**7933**
Women	1703	886	3142	**5731**				**5731**
	(37%)	(40%)	(46%)	**(42%)**				**(42%)**
Total Math degrees	**4554**	**2226**	**6884**	**13664**				**13664**
Mathematics Education majors								
Men	274	562	1187	**2023**				**2023**
Women	414	928	1626	**2968**				**2968**
	(60%)	(62%)	(58%)	**(59%)**				**(59%)**
Total Math Ed degrees	**688**	**1490**	**2813**	**4991**				**4991**
Statistics majors								
Men	36	43	24	**103**	161	62	**223**	**326**
Women	48	65	34	**147**	139	32	**171**	**318**
	(57%)	(60%)	(59%)	**(59%)**	(46%)	(34%)	**(43%)**	**(49%)**
Total Stat degrees	**84**	**108**	**58**	**250**	**300**	**94**	**394**	**644**
Computer Science majors								
Men	146	1189	1172	**2507**				**2507**
Women	41	322	445	**808**				**808**
	(22%)	(21%)	(28%)	**(24%)**				**(24%)**
Total CS degrees	**187**	**1511**	**1617**	**3315**				**3315**
Total degrees - Men	**3307**	**3134**	**6125**	**12566**	**161**	**62**	**223**	**12789**
Total degrees - Women	**2206**	**2201**	**5247**	**9654**	**139**	**32**	**171**	**9825**
	(40%)	**(41%)**	**(46%)**	**(43%)**	**(46%)**	**(34%)**	**(43%)**	**(43%)**
Total all degrees	**5513**	**5335**	**11372**	**22220**	**300**	**94**	**394**	**22614**

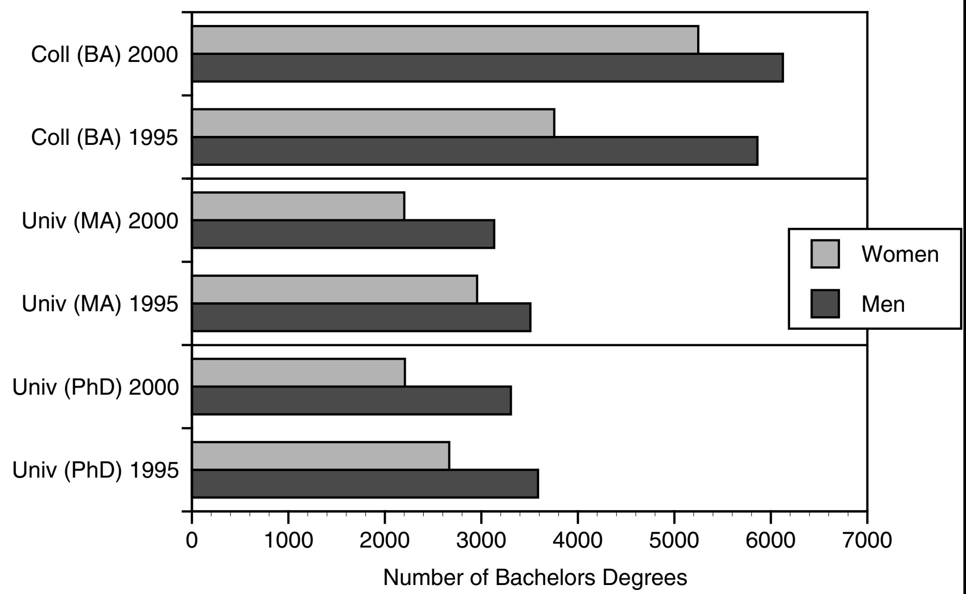

FIGURE E.1.1 Bachelors degrees in Mathematics Departments awarded between July 1, 1994, and June 30, 1995, and between July 1, 1999, and June 30, 2000, by gender of degree recipient and by type of school.

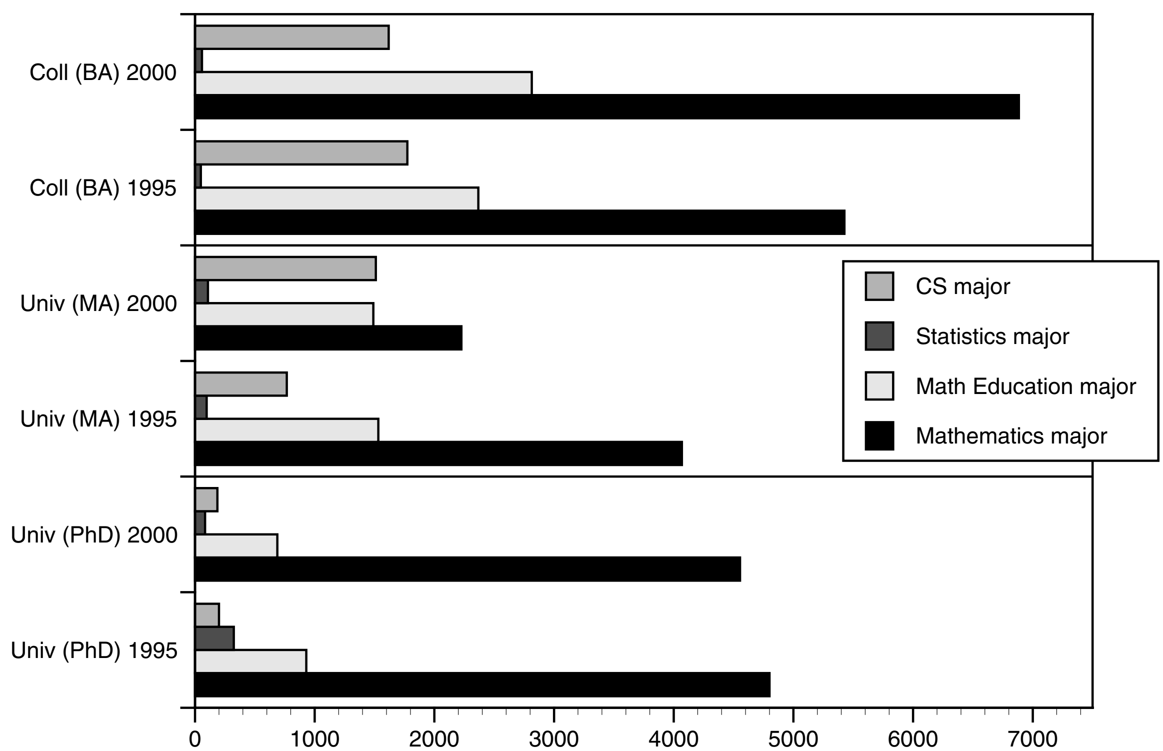

FIGURE E.1.2 Bachelors degrees awarded in Mathematics, Mathematics Education, Statistics, and Computer Science by Mathematics Departments between July 1, 1994, and June 30, 1995, and between July 1, 1999, and June 30, 2000, by type of school.

TABLE E.2: Fall Enrollments in Mathematics, Statistics, and Computer Science Courses

By fall 2000, overall mathematical sciences fall enrollments in mathematics departments rebounded by about 11% from their 1995 lows, almost reaching fall 1990 levels. Overall enrollments in statistics departments continued their decade-long rise, although at a slower pace than between 1990 and 1995.

As in previous CBMS studies, the mathematical sciences curriculum was divided into various levels and sub-disciplines. Mathematics was divided into remedial level, introductory level (including pre-calculus), calculus level, and advanced mathematics. Statistics was divided into elementary level and upper level. Computer science was divided into lower, middle, and upper levels. For a complete listing of the levels and the courses within them, see Appendix I.

Enrollment growth in the mathematical sciences was not uniform. Remedial level fall term enrollments were down 1% between fall 1995 and fall 2000 and were down about 16% compared to fall 1990. Only in bachelors-level departments did remedial level enrollments increase after 1995, and in fall 2000 they slightly exceeded their fall 1990 level. Introductory level enrollments, which include the Liberal Arts Mathematics course as well as pre-calculus courses, rose by about 18% between fall 1995 and fall 2000, and by about 22% compared to fall 1990. Calculus level enrollments rose from their 1995 lows, but remained about 12% below their 1990 levels. The calculus level increase between fall 1995 and fall 2000 occurred in doctoral and masters departments while calculus level enrollments in bachelors departments dropped 9% from 1995 levels.

Advanced mathematics enrollments grew from their fall 1995 lows, but fell short of 1990 levels by about 14%. Only in bachelors-level departments did advanced mathematics enrollments rise to a level that exceeded both 1990 and 1995.

Statistics enrollments in mathematics departments grew 19% compared to fall 1995, and exceeded their fall 1990 levels by 37%. Statistics enrollments in statistics departments rose almost 14% above 1995 levels and exceeded 1990 levels by about 68%. Combined statistics course enrollments for both mathematics and statistics departments climbed about 18% from 1995 totals, and by about 45% from 1990 levels. As was the case in 1995, almost 70% of all undergraduate statistics enrollments were in mathematics departments.

Computer science enrollments in mathematics departments were primarily in bachelors- and masters-level departments. They climbed 24% from fall 1995 levels, but still remained less than 70% of their 1990 levels.

Enrollment histories for individual courses are given in Appendix I. Of special interest for predicting upper division mathematics enrollments and the number of bachelors degrees in mathematics and statistics are the enrollment histories of mainstream Calculus I, II, and III. (The word "mainstream" means "can serve as a prerequisite for upper division mathematical sciences courses.") In 1990, mainstream Calculus I and II had fall term enrollments of 201,000 and 88,000, respectively. By 1995, the figures had dropped to 192,000 and 83,000. Fall 2000 enrollments in mainstream Calculus I remained at 192,000, and mainstream Calculus II fall enrollments rose slightly, to 87,000. It is interesting to note that fall term enrollments in mainstream Calculus II were steadier than Calculus I enrollments between fall 1990 and fall 2000. This may be evidence of a larger number of entering freshmen having a good knowledge of Calculus I from their high school educations. Finally, fall enrollments in Calculus III (and Calculus IV in departments not using the semester system) rose by almost 18% since fall 1995, to about 73,000.

TABLE E.2 Enrollment (in thousands) in undergraduate Mathematics, Statistics, and Computer Science courses in Mathematics Departments and in Statistics Departments by level of course and type of school: Fall 2000. Also full-time faculty: Fall 2000. (Numbers in parentheses are (1990,1995) enrollments.)

	Fall 2000 (1990,1995) enrollments (1000s)						
	Mathematics Departments				Statistics Departments		
	Univ (PhD)	Univ (MA)	Coll (BA)	**Total Math Depts**	Univ (PhD)	Univ (MA)	**Total Stat Depts**
Number of full-time faculty 2000	6702	5002	7303	**19007**	875	146	**1021**
Mathematics courses							
Remedial	59	59	101	**219**			
	(68,60)	(93,84)	(100,78)	**(261,222)**			
Introductory (incl. Precalc)	258	227	238	**723**			
	(205,222)	(202,193)	(185,198)	**(592,613)**			
Calculus	302	131	137	**570**			
	(337,264)	(122,124)	(188,150)	**(647,538)**			
Advanced Mathematics	43	24	35	**102**			
	(58,41)	(29,25)	(32,30)	**(119,96)**			
Total Math courses	**662**	**441**	**511**	**1614**			
	(668,587)	**(446,426)**	**(505,456)**	**(1619,1469)**			
Statistics courses							
Elementary Statistics	38	35	63	**136**	46	8	**54**
	(14,23)	(27,35)	(46,57)	**(87,115)**	(25,46)	(5,3)	**(30,49)**
Upper Statistics	12	12	11	**35**	17	3	**20**
	(18,10)	(12,7)	(8,11)	**(38,28)**	(14,16)	(0,0)	**(14,16)**
Total Stat courses	**50**	**47**	**74**	**171**	**63**	**11**	**74**
	(32,33)	**(39,42)**	**(54,68)**	**(125,143)**	**(39,62)**	**(5,3)**	**(44,65)**
CS courses							
Lower CS	5	33	52	**90**	0	1	**1**
	(9,4)	(42,18)	(83,52)	**(134,74)**	(0,0)	(0,1)	**(0,1)**
Middle CS	1	7	9	**17**			
	(1,0)	(4,3)	(7,10)	**(12,13)**			
Upper CS	2	6	8	**16**			
	(6,2)	(12,4)	(16,6)	**(34,12)**			
Total CS courses	**8**	**46**	**69**	**123**	**0**	**1**	**1**
	(16,6)	**(58,25)**	**(106,68)**	**(180,99)**	**(0,0)**	**(0,1)**	**(0,1)**
Total all courses	**720**	**534**	**654**	**1908**	**63**	**12**	**75**
	(716,626)	**(543,493)**	**(665,592)**	**(1924,1711)**	**(39,62)**	**(5,4)**	**(44,66)**

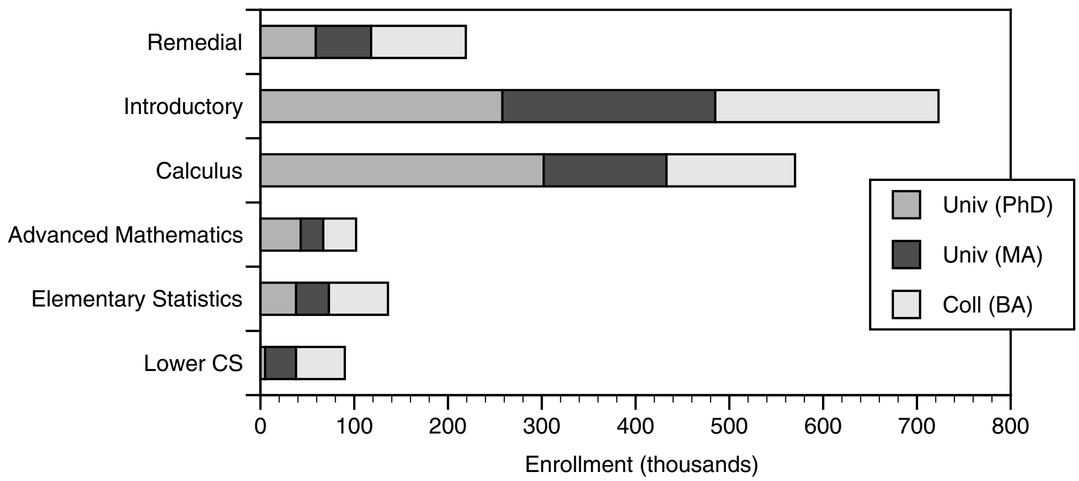

FIGURE E.2.1 Enrollment (thousands) in undergraduate Mathematics, Statistics, and Computer Science courses in Mathematics Departments by level of course and type of school: Fall 2000.

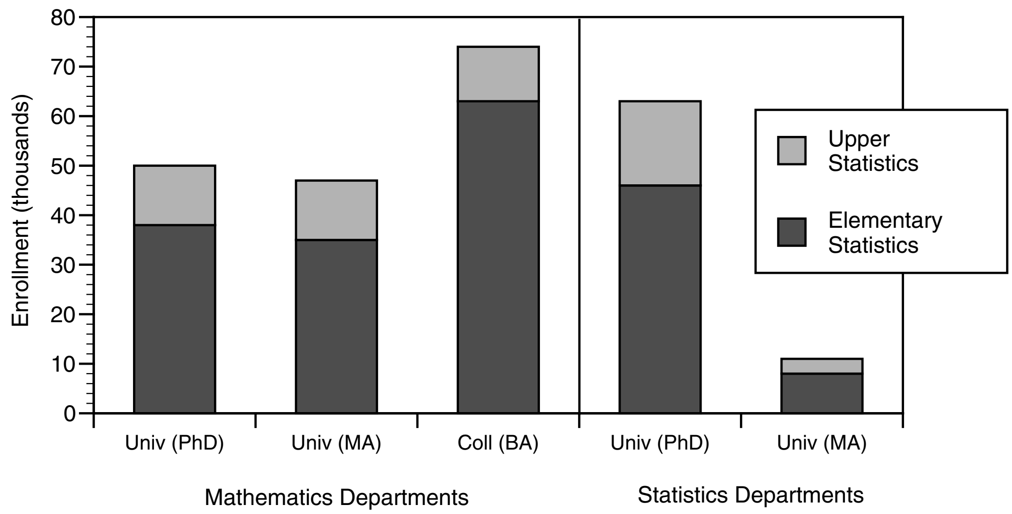

FIGURE E.2.2 Enrollment (thousands) in undergraduate Statistics courses in Mathematics Departments and Statistics Departments by level of course and type of school: Fall 2000.

TABLES E.3–E.9: Who Teaches Undergraduates in Four-Year Colleges and Universities?

The tables in this section are elaborations of Tables SFY.17, SFY.18, and SFY.19 in Chapter 1.

Table E.3 is the first of seven tables that describe the percentages of enrollments in lower and middle level courses in mathematics departments and statistics departments that were taught by different types of instructors (tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants). Table E.3 gives overall enrollment figures and Tables E.4 to E.9 show enrollment percentages in various subcategories of the mathematical sciences and computer science curricula. See Appendix II for a discussion of the methodology used to estimate the percentages of enrollments. As a result of that methodology, figures for standard errors are not available for estimates of percentages of enrollments. Tables E.3 through E.9 deal only with freshman and sophomore courses because, as was the case in CBMS1995, we made the assumption that all upper level courses were taught by tenured and tenure-eligible faculty.

Comparison of Tables E.3 through E.9 with the corresponding tables from CBMS1995 is complicated by the fact that many respondents to the CBMS2000 survey did not identify the instructors of a certain percentage of their sections. In response we created a new category called "Unknown Instructor," and in many cases the unknown instructor percentage was 10% or more. Part of the unknown instructor percentage occurs because many departments taught at least some of their sections by "distance learning," a topic discussed in Chapter 2 of this report, and these sections were not categorized by type of instructor. However, the number of sections taught by distance learning does not come close to accounting for the percentage of enrollments listed as having "unknown instructor" in Tables E.3 through E.9.

Tables E.4 through E.9 give details about the percentages of enrollments in the lower and middle parts of the curriculum that were taught by various types of instructors. Like Table E.3, they often have large percentages of "Unknown Instructors" that make direct comparisons with 1995 data problematic. Nevertheless, taken together, Tables E.4 to E.9 point to three common conclusions about changes that occurred between fall 1995 and fall 2000:

a) the percentage of students taught by tenured and tenure-eligible instructors was down, sometimes markedly;

b) the percentage of enrollment taught by other full-time faculty (visitors, post-docs, etc.) and by part-time faculty was up;

c) the percentage of enrollments taught by graduate teaching assistants was down, often to a pronounced degree.

There are exceptions, but they are minor. For example, Table E.4 reports that the percentage of remedial level enrollments taught by tenured and tenure-eligible faculty rose from 14% to 15% between fall 1995 and fall 2000, and Table E.8 reports that the percentage of lower level computer science enrollments taught by graduate students rose from 0% to 1%.

TABLE E.3 Percentage of enrollment in undergraduate Mathematics, Statistics, and Computer Science courses taught by tenured/tenure-eligible (T/TE), other full-time (OFT), part-time (PT), graduate teaching assistants (GTA), and unknown (Ukn) in Mathematics Departments and in Statistics Departments by type of school: Fall 2000 (Fall 1995 figures in parentheses).

	Percentage of Mathematics enrollment taught by						Percentage of Statistics enrollment taught by						Percentage of CS enrollment taught by					
	T/TE %	OFT %	PT %	GTA %	Ukn %	**Mathematics enrollment 1000s**	T/TE %	OFT %	PT %	GTA %	Ukn %	**Statistics enrollment 1000s**	T/TE %	OFT %	PT %	GTA %	Ukn %	**CS enrollment 1000s**
Mathematics Departments																		
Univ (PhD)	38	19	19	21	3	662	54	10	16	17	3	50	47	32	9	2	10	8
	(39)	(14)	(13)	(33)		(587)	(52)	(6)	(10)	(33)		(33)	(82)	(6)	(12)	(0)		(6)
Univ (MA)	40	22	24	5	9	441	66	13	11	1	9	47	46	12	33	0	9	46
	(49)	(16)	(22)	(12)		(426)	(75)	(9)	(12)	(4)		(42)	(63)	(17)	(19)	(1)		(25)
Coll (BA)	54	14	25	0	7	511	52	15	26	0	7	74	48	24	16	0	12	69
	(65)	(10)	(24)	(0)		(456)	(77)	(5)	(19)	(0)		(68)	(68)	(14)	(19)	(0)		(68)
Statistics Departments																		
Univ (PhD)							50	13	14	19	4	63						0
							(55)	(8)	(6)	(30)		(62)						(0)
Univ (MA)							61	15	5	10	9	11						1
							(63)	(21)	(15)	(0)		(3)						(1)

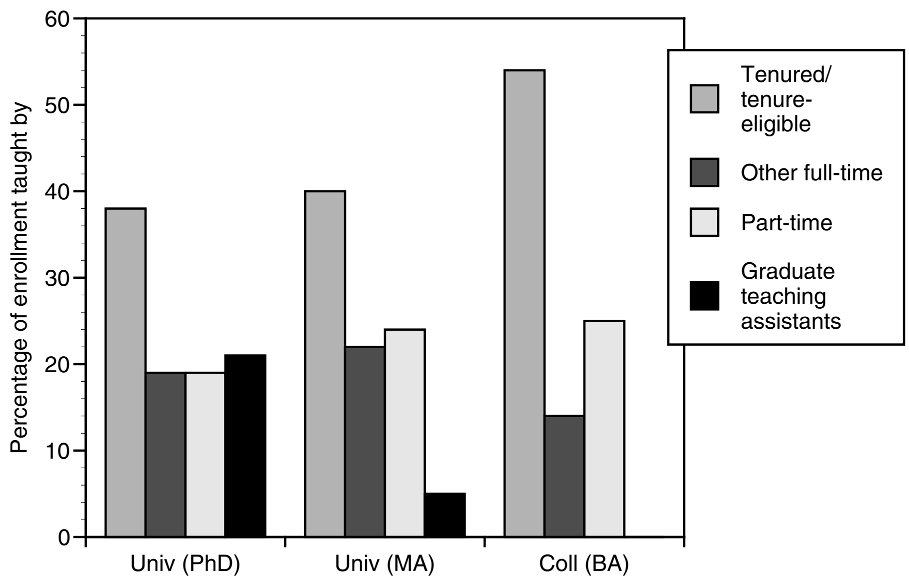

FIGURE E.3.1 Percentage of enrollment in undergraduate Mathematics courses taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in Mathematics Departments by type of school: Fall 2000.

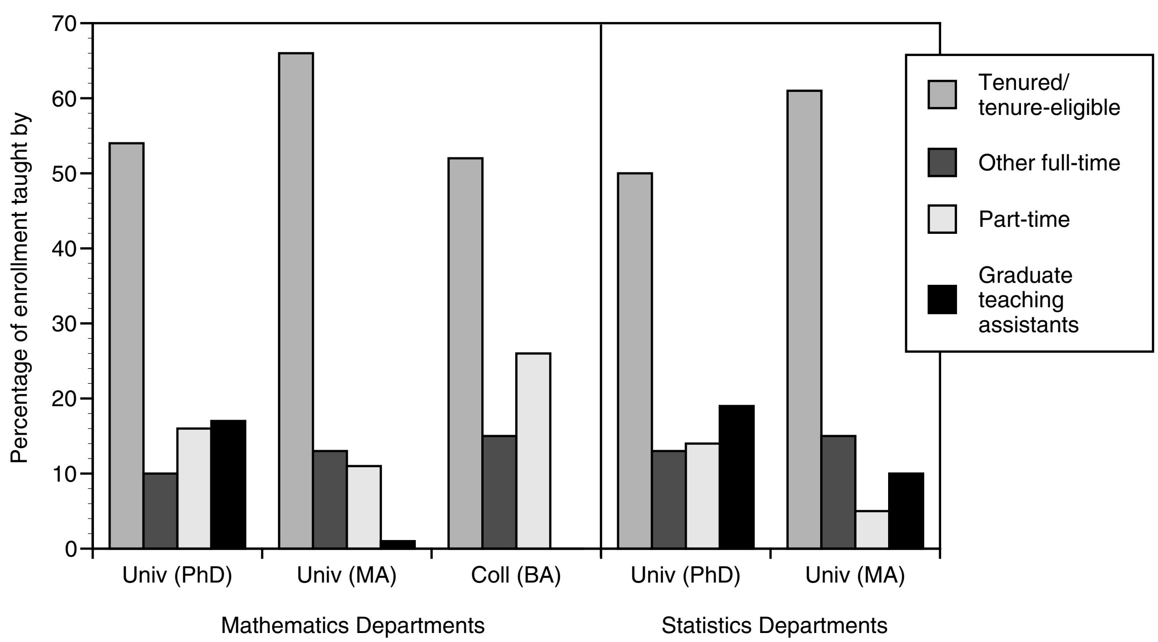

FIGURE E.3.2 Percentage of enrollment in undergraduate Statistics courses taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in Mathematics Departments and Statistics Departments by type of school: Fall 2000.

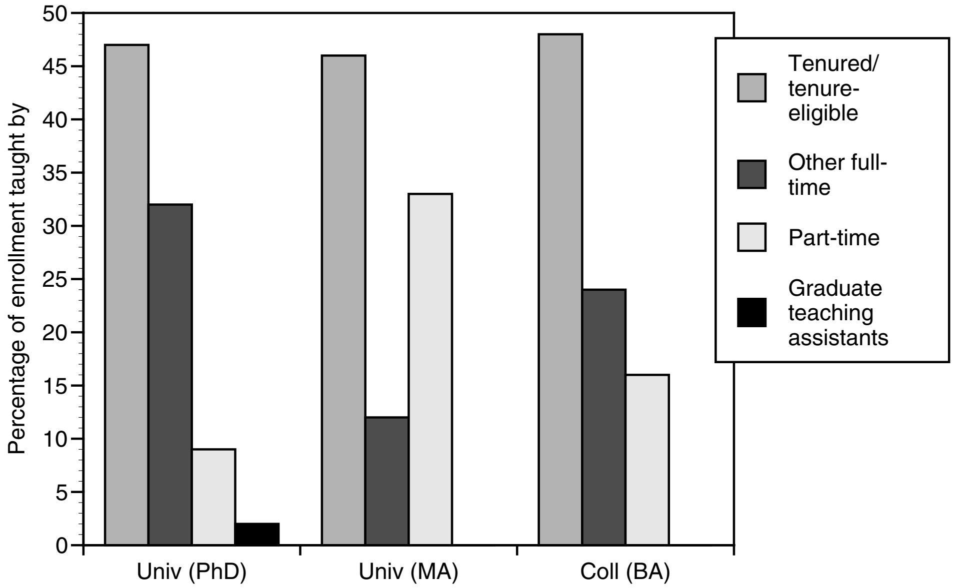

FIGURE E.3.3 Percentage of enrollment in undergraduate Computer Science courses taught by tenured/tenure-eligible, other full-time, part-time, and graduate teaching assistants in Mathematics Departments by type of school: Fall 2000.

TABLE E.4 Percentage of enrollment in Remedial level courses taught in Mathematics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Percentage of enrollment taught by					
	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Ukn %	**Total enrollment 1000s**
Mathematics Departments						
Univ (PhD)	3 (1)	13 (12)	43 (33)	32 (54)	9	**59** **(60)**
Univ (MA)	7 (12)	26 (16)	46 (41)	12 (30)	9	**59** **(84)**
Coll (BA)	26 (26)	16 (12)	46 (61)	0 (1)	12	**101** **(78)**
Total	**15** **(14)**	**18** **(14)**	**45** **(46)**	**12** **(26)**	**10**	**219** **(222)**

TABLE E.5 Percentage of enrollment in Introductory level (including precalculus) courses in Mathematics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Percentage of enrollment taught by					
	Tenured/ tenure- eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Ukn %	**Total enrollment 1000s**
Mathematics Departments						
Univ (PhD)	17 (18)	25 (17)	24 (16)	31 (49)	3	**258** **(222)**
Univ (MA)	28 (42)	28 (22)	27 (24)	6 (12)	11	**227** **(193)**
Coll (BA)	47 (63)	16 (14)	31 (23)	0 (0)	6	**238** **(198)**
Total	**30** **(40)**	**23** **(18)**	**27** **(21)**	**13** **(22)**	**7**	**723** **(613)**

TABLE E.6 Percentage of enrollment in Calculus level courses taught in Mathematics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Percentage of enrollment taught by					
	Tenured/ tenure- eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Ukn %	**Total enrollment 1000s**
Mathematics Departments						
Univ (PhD)	54 (62)	18 (13)	12 (7)	14 (19)	2	**302** **(264)**
Univ (MA)	65 (76)	14 (11)	15 (11)	1 (2)	5	**131** **(124)**
Coll (BA)	75 (81)	13 (7)	7 (12)	0 (0)	5	**137** **(150)**
Total	**61** **(71)**	**16** **(11)**	**12** **(9)**	**8** **(10)**	**3**	**570** **(538)**

TABLE E.7 Percentage of enrollment in Elementary Level Statistics courses taught in Mathematics Departments and Statistics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Percentage of enrollment taught by					
	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Ukn %	**Total enrollment 1000s**
Mathematics Departments						
Univ (PhD)	40 (31)	13 (8)	21 (15)	23 (47)	3	**38** **(23)**
Univ (MA)	54 (70)	17 (11)	15 (14)	2 (5)	12	**35** **(35)**
Coll (BA)	44 (72)	17 (4)	31 (23)	0 (0)	8	**63** **(57)**
Total Math Depts	**45** **(63)**	**16** **(7)**	**24** **(19)**	**7** **(11)**	**8**	**136** **(115)**
Statistics Departments						
Univ (PhD)	31 (40)	17 (11)	20 (9)	27 (41)	5	**46** **(46)**
Univ (MA)	46 (63)	20 (21)	7 (15)	14 (0)	13	**8** **(3)**
Total Stat Depts	**33** **(41)**	**18** **(12)**	**18** **(9)**	**25** **(38)**	**6**	**54** **(49)**

TABLE E.8 Percentage of enrollment in Lower Level Computer Science courses taught in Mathematics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Percentage of enrollment taught by					
	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Ukn %	**Total enrollment 1000s**
Mathematics Departments						
Univ (PhD)	34 (73)	39 (9)	14 (18)	2 (0)	11	**5 (4)**
Univ (MA)	39 (54)	15 (20)	39 (24)	0 (2)	7	**33 (18)**
Coll (BA)	39 (61)	29 (15)	18 (25)	1 (0)	13	**52 (52)**
Total	**39 (60)**	**24 (16)**	**26 (24)**	**1 (0)**	**10**	**90 (74)**

TABLE E.9 Percentage of enrollment in Middle Level Computer Sciences courses taught in Mathematics Departments by type of instructor and type of school: Fall 2000 (Fall 1995 figures in parentheses).

	Percentage of enrollment taught by					
	Tenured/ tenure-eligible %	Other full-time %	Part-time %	Graduate teaching assistants %	Ukn %	**Total enrollment 1000s**
Mathematics Departments						
Univ (PhD)	29 (na)	56 (na)	0 (na)	0 (na)	15	**1 (0)**
Univ (MA)	62 (68)	7 (20)	20 (13)	0 (0)	11	**7 (3)**
Coll (BA)	70 (82)	14 (17)	13 (1)	0 (0)	3	**9 (10)**
Total	**65 (79)**	**13 (18)**	**15 (4)**	**0 (0)**	**7**	**17 (13)**

TABLES E.10–E.12: Measuring Department Effort by Sections Offered

One way to study the national teaching effort in undergraduate mathematical and computer sciences is to look at the percentages of enrollments taught by various kinds of instructors, and that is the approach used in Tables E.3 to E.9. A different way is to study the number and sizes of sections offered, and who is assigned to teach them. Because of varying average section sizes, the two approaches do not give identical percentages. Data on numbers of sections offered, on average section sizes, and on who taught those sections in fall 2000 appear in Tables E.10, E.11, and E.12. These tables may be compared with Tables E.2 and E.3.

A. Changes in Numbers of Sections During the 1990s

The CBMS1995 survey showed that there was a marked decline in the number of fall term sections offered at the remedial level, the calculus level, and in both lower and upper level computer science between 1990 and 1995. The CBMS2000 survey shows that there was a reversal of that trend between fall 1995 and fall 2000. Although fall 2000 figures rose from 1995 levels, they were still below the levels found in fall 1990. For example, while the estimate of the number of remedial sections in fall 2000 exceeds the corresponding estimate in fall 1995, it is only at 90% of its level in fall 1990, and the number of calculus level sections was only 86% of what it was ten years earlier. The numbers of lower and upper level computer science sections rebounded to about 74% and 61% of their 1990 levels, respectively.

The number of sections offered by mathematics departments at the introductory level (which includes Liberal Arts mathematics as well as pre-calculus courses) grew between 1990 and 1995, and continued to grow between 1995 and 2000, although at a slower pace, reaching 120% of its 1990 level by fall 2000.

The number of advanced mathematics sections was down from 1995 levels. Their decade-long history shows 7,650 advanced mathematics sections in fall 1990, then 8,057 in fall 1995, and 7,743 in fall 2000. The number of advanced mathematics sections ended the decade of the 1990s just slightly above where it began.

The number of elementary level statistics sections offered by mathematics departments in fall 2000 was 21% above its fall 1995 level and was 64% above its level ten years earlier. The number of sections of elementary level statistics taught in statistics departments increased by 12% from 1995 to 2000 and in fall 2000 was 84% above its 1990 level. As was the case in 1995, the majority of elementary level statistics sections taught in the U.S. were offered by mathematics departments — almost five times as many as were offered by statistics departments.

Comparison with 1995 data shows a shift in the way that mathematics departments allocated their effort among mathematics, statistics, and computer science, as measured by the number of sections offered in each. Between 1995 and 2000, the percentage of all sections offered in mathematics courses dropped from 82.8% to 80.5%, while the percentage of sections offered in statistics rose from 8.6% to 9.3% and the percentage of sections in computer science rose from 8.6% to 10.2%.

Table E.10 shows that about 11.6% of all sections taught by mathematics departments in fall 2000 were advanced level mathematics, compared to about 13% in 1995. The percentage was not uniform across departments: about 14% of (undergraduate) sections offered by doctoral departments were devoted to advanced mathematics, while the corresponding figure was about 10 % in masters-level departments and 11% in bachelors-level departments. In fall 1995, the corresponding percentages were 15% in doctoral departments, 11% in masters departments, and 13.5% in bachelors departments.

At the other end of the spectrum, about 11.4% of all fall term 2000 sections taught in mathematics departments were devoted to remedial level courses, down slightly from 1995. Once again, the decrease was not uniform across departments. Remedial sections were down slightly in doctoral departments, and markedly in masters departments (from about 15% in fall 1995 to 9% in fall 2000), while in bachelors-level departments, remedial level teaching rose from 11% to 14.5% of all sections offered.

As noted above, the percentage of all mathematics department sections devoted to statistics rose from 8.6% to 9.3% between fall 1995 and fall 2000. The largest percentage increase occurred in Ph.D. mathematics departments, which devoted about 5.9% of their sections to statistics in fall 1995 and about 8.1% in fall 2000. This increase in sections offered is consistent with the enrollment figures in Table E.2, showing that statistics enrollments in mathematics departments rose from 8.36% of all enrollments in fall 1995 to 8.96% in fall 2000.

B. Average Section Size

Within the broad course categories considered in Table E.11, national average section sizes in fall 2000 were not much changed from 1995 levels, except in middle level computer science courses where the average increased substantially. Elementary statistics sections tended to be the largest of all, followed closely by introductory mathematics sections. While there was substantial variation in average section sizes in calculus courses (see also Chapter 5), it is interesting to note that the national average was 32 students per calculus section, only slightly above the level of 30 students per section recommended by professional societies ([MAA Guidelines]).

If one looks at average section sizes by type of course and type of department (see Table E.11), one sees that average section sizes in doctoral mathematics departments increased in almost every category of course (remedial, introductory, etc.) between fall 1995 and fall 2000. In masters-level departments, average section sizes increased in about half of the course categories and decreased in about half, while average section sizes in bachelors-level mathematics departments dropped except in advanced mathematics, upper level statistics, and middle and upper level computer science. Statistics departments saw a substantial rise in average section sizes. That increase was the natural consequence of staffing decreases in statistics departments (see Chapter 4) at the same time that statistics department enrollments increased by 14% between 1995 and 2000.

TABLE E.10 Number of sections of undergraduate Mathematics, Statistics, and Computer Science courses in Mathematics Departments and Statistics Departments by level of course and type of school: Fall 2000 (1995 figures in parentheses).

	Number of sections: Fall 2000 (Fall 1995)						
	Mathematics Departments				Statistics Departments		
	Univ (Phd)	Univ (MA)	Coll (BA)	**Total Math Depts**	Univ (PhD)	Univ (MA)	**Total Stat Depts**
Mathematics courses							
Remedial	1493 (1663)	1772 (2670)	4388 (2913)	**7653 (7246)**			
Introductory (incl. Precalc)	5032 (5258)	6506 (5673)	8987 (7036)	**20525 (17967)**			
Calculus	6768 (6061)	4551 (4280)	6438 (6932)	**17757 (17273)**			
Advanced Mathematics	2392 (2531)	1936 (1886)	3415 (3640)	**7743 (8057)**			
Total Math courses	15685 (15513)	14765 (14509)	23228 (20521)	**53678 (50543)**			
Statistics courses							
Elementary Statistics	827 (551)	1064 (1028)	2372 (1951)	**4263 (3530)**	786 (748)	123 (72)	**909 (810)**
Upper Statistics	580 (446)	638 (482)	728 (768)	**1946 (1696)**	476 (576)	122 (48)	**598 (624)**
Total Stat courses	1407 (997)	1702 (1511)	3100 (2719)	**6209 (5227)**	1262 (1324)	245 (120)	**1507 (1444)**
CS courses							
Lower CS	92 (137)	1553 (796)	2557 (2431)	**4202 (3364)**	4 (7)	12 (30)	**16 (37)**
Middle CS	24 (48)	465 (245)	590 (651)	**1079 (944)**	0 (0)	2 (4)	**2 (4)**
Upper CS	98 (89)	527 (230)	868 (652)	**1493 (971)**	0 (0)	8 (10)	**8 (10)**
Total CS courses	214 (274)	2545 (1271)	4015 (3734)	**6774 (5279)**	4 (7)	22 (44)	**26 (51)**
Total all courses	**17306 (16784)**	**19012 (17291)**	**30343 (26974)**	**66661 (61049)**	**1266 (1391)**	**267 (168)**	**1533 (1559)**

TABLE E.11 Average section size for undergraduate Mathematics, Statistics, and Computer Sciences courses in Mathematics Departments and Statistics Departments by level of course and type of school: Fall 2000 (1995 data in parentheses). Also, all departments' average section sizes from previous CBMS surveys.

	Average section size Fall 2000 (1995)								
	Mathematics Depts			Statistics Depts					
	Univ (PhD)	Univ (MA)	Coll (BA)	Univ (PhD)	Univ (MA)	**All Depts 1985**	**All Depts 1990**	**All Depts 1995**	**All Depts 2000**
Mathematics courses									
Remedial	39 (36)	33 (32)	23 (27)			32	31	31	29
Introductory (incl. Precalc)	51 (42)	35 (34)	26 (28)			35	35	34	35
Calculus	45 (44)	29 (29)	21 (22)			34	35	31	32
Advanced Mathematics	18 (16)	12 (14)	10 (8)			19	16	12	13
Statistics courses									
Elementary Statistics	46 (42)	33 (34)	27 (29)	58 (50)	65 (42)	37	37	38	37
Upper Statistics	21 (22)	19 (15)	15 (14)	36 (27)	25 (23)	30	24	19	22
CS courses									
Lower CS	50 (29)	21 (23)	20 (21)	13 (na)	58 (na)	na	24	22	22
Middle CS	39 (na)	16 (12)	16 (15)		90 (na)	na	15	14	22
Upper CS	21 (22)	12 (17)	10 (9)		30 (na)	na	14	12	11

TABLE E.12 Percentage of sections of Mathematics, Statistics, and Computer Science courses taught by tenured/tenure-eligible (T/TE), other full-time (OFT), part-time (PT), graduate teaching assistants (GTAs), and unknown (Ukn) in Mathematics Departments and Statistics Departments by type of school: Fall 2000 (Fall 1995 figures in parentheses).

	Percentage of Mathematics sections taught by						Percentage of Statistics sections taught by						Percentage of CS sections taught by					
	T/TE %	OFT %	PT %	GTAs %	Ukn %	**No. of Math sections**	T/TE %	OFT %	PT %	GTAs %	Ukn %	**No. of Stat sections**	T/TE %	OFT %	PT %	GTAs %	Ukn %	**No. of CS sections**
Math Depts																		
Univ (PhD)	42	16	17	21	4	**15685**	63	9	11	14	3	**1407**	59	17	6	3	15	**214**
	(45)	(11)	(12)	(31)		**(15513)**	(61)	(3)	(8)	(28)		**(997)**	(81)	(7)	(12)	(0)		**(274)**
Univ (MA)	48	19	22	5	6	**14765**	72	9	11	1	7	**1702**	47	11	35	0	7	**2545**
	(54)	(15)	(20)	(10)		**(14509)**	(79)	(8)	(10)	(3)		**(1511)**	(67)	(15)	(17)	(1)		**(1271)**
Coll (BA)	60	13	21	0	6	**23228**	59	13	22	0	6	**3100**	56	18	15	0	11	**4015**
	(70)	(9)	(21)	(0)		**(20521)**	(82)	(3)	(16)	(0)		**(2719)**	(73)	(10)	(17)	(0)		**(3734)**
Total Math Depts	**52**	**15**	**20**	**7**	**6**	53678	**63**	**11**	**17**	**4**	**5**	6209	**53**	**15**	**22**	**0**	**10**	6774
	(58)	**(11)**	**(18)**	**(12)**		(50543)	**(77)**	**(4)**	**(13)**	**(6)**		(5227)	**(72)**	**(11)**	**(17)**	**(0)**		(5279)
Stat Depts																		
Univ (PhD)	Too few cases in the sample to make reliable estimates						53	8	14	20	5	**1262**	Too few cases in the sample to make reliable estimates					**4**
							(64)	(10)	(5)	(21)		**(1324)**						**(7)**
Univ (MA)							71	9	5	4	12	**245**						**22**
							(79)	(13)	(8)	(0)		**(120)**						**(44)**
Total Stat Depts							**56**	**8**	**12**	**18**	**6**	1507						**26**
							(65)	**(10)**	**(5)**	**(19)**		(1444)						**(51)**

TABLES E.13–E.18: Who Teaches Undergraduate Sections?

These six tables are related to Table E.3. They report the numbers of sections (rather than the numbers or percentages of enrollments) in various types of courses (remedial level, introductory level, etc.) taught by different types of instructors in different types of departments.

Table E.13 and Table E.17 contain apparently anomalous data suggesting that the bachelors-level mathematics departments in the U.S. used graduate teaching assistants to staff about one half of one percent of their fall 2000 sections in remedial level and lower level computer science courses. Similar data appeared in Table E.13 of the report of the CBMS1995 survey. We know that in fall 2000 there were bachelors-level mathematics departments in the U.S. that borrowed graduate teaching assistants from other departments or interdisciplinary graduate programs on their campuses, and that is one possible explanation of this strange data.

There were clear differences between the ways that different types of departments staffed their sections in fall 2000. Doctoral mathematics departments covered about 16% of their remedial level sections using full-time faculty (tenured, tenure-eligible, and other full-time) while bachelors-level departments taught 48% of their remedial sections with such full-time faculty. At the calculus level, Ph.D. departments covered about 69% of their sections using full-time faculty (tenured, tenure-eligible, or other full-time), while bachelors departments covered 88% of their sections using such faculty. Masters-level departments were typically between the Ph.D. and bachelors departments in terms of these percentages.

All departments except the doctoral statistics departments staffed at least fifty percent of their elementary statistics sections using full-time faculty (tenured, tenure-eligible, and other full-time) in fall 2000 while doctoral statistics departments covered 38% of elementary statistics sections using such faculty. This was a reversal of the situation in 1995 when doctoral mathematics departments staffed 35% of elementary level statistics sections using full-time faculty and doctoral statistics departments used full-time faculty to teach 54% of such sections.

As was the case in 1995, the vast majority of computer science sections offered by mathematics departments were taught in bachelors- and masters-level departments. Doctoral mathematics departments taught about 2% of the roughly 4200 sections of lower level computer science offered by U.S. mathematics departments in fall 2000, down from about 4% in fall 1995. In masters-level departments, 49% of lower level computer science courses were taught by full-time faculty in fall 2000, while in bachelors departments the percentage was 67%.

For most types of courses, the overall number of sections offered grew roughly in proportion to enrollment increases noted in Table E.2. The remedial level was an exception. Table E.13 shows that the overall number of remedial sections increased by about 5% between fall 1995 and fall 2000, even though Table E.2 shows a decrease of about 1.3% in remedial level enrollments during that same period.

Tables in this section reveal some important staffing shifts since 1995. There was a shift of full-time faculty toward remedial and introductory level course teaching and away from all other course categories (except advanced level courses which we assumed were all taught by tenured and tenure-eligible faculty). The number of tenured and tenure-eligible faculty assigned to teach remedial sections rose by more than 40% since 1995, and the remedial level was the only course level that saw an increase (in sections taught by tenured and tenure-eligible faculty). The number of sections taught by other full-time faculty increased by about the same percentage, while the number of remedial sections taught by part-time faculty dropped slightly and the number of sections taught by graduate teaching assistants dropped by almost 60% during the five years between 1995 and 2000. However, the number of remedial sections taught by tenured and tenure-eligible faculty still remained relatively small; only about one in five remedial sections was taught by tenured and tenure-eligible faculty, and the fraction of remedial sections taught by other full-time faculty was slightly smaller.

Except in advanced level courses, responsibility for teaching shifted away from tenured and tenure-eligible faculty and toward other full-time and part-time faculty, and sometimes the shifts were quite large. In almost all course categories, the number of sections taught by graduate teaching assistants declined, in most cases by 40% or more. Calculus level courses were the exception: the decrease in sections taught by graduate teaching assistants was about 20%.

Table E.14 shows that the number of sections devoted to introductory level courses rose by about 14%, while enrollment in these courses grew by 18% (see Table E.2). There was a 36% drop in the number of introductory sections taught by graduate teaching assistants, coupled with a 40% and 49% increase in the number of sections taught by other full-time faculty (i.e., full-time but not tenured or tenure-eligible) and by part-time faculty respectively.

The number of calculus level sections, studied in Table E.15, rose by about 3% between fall 1995 and fall 2000, corresponding to an enrollment increase of about 6% in all calculus level courses. The number of sections taught by graduate teaching assistants dropped by about 20%, and the number of sections taught by other full-time faculty rose by more than 50% during the same five year period. The number of calculus level sections taught by tenured and tenure-eligible faculty dropped slightly, and the number taught by part-time faculty grew slightly.

In mathematics departments, the number of elementary level statistics sections rose by about 20% (see Table E.16) while enrollment in these courses rose by about 18% between fall 1995 and fall 2000. The number of elementary level statistics sections taught by tenured and tenure-eligible faculty dropped by about 15% while the number of sections taught by other full-time faculty more than tripled, and the number taught by part-time faculty increased by about 60%. At the same time, the number of elementary level statistics sections taught by graduate teaching assistants dropped by about 35%. In statistics departments, enrollment in elementary statistics rose by about 10% from fall 1995 levels, remaining at less than half of the elementary statistics enrollment in mathematics departments. The number of fall sections taught by tenured and tenure-eligible faculty dropped by about 25% from 1995 levels, while the number of sections taught by part-time faculty more than doubled, and the number of sections taught by graduate teaching assistants remained about the same.

Table E.2 shows that enrollments in lower level computer science courses taught in mathematics departments grew by over 20% between fall 1995 and fall 2000, and the number of sections offered grew by about 25% (Table E.17). The number of sections taught by tenured and tenure-eligible faculty declined by about 15% while the number of sections taught by other full-time faculty and part-time faculty grew by 73% and 40% respectively. The number of sections taught by graduate teaching assistants remained at the same negligible level (less than half of 1%) as in 1995.

TABLE E.13 Number of sections of Remedial level courses in Mathematics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Number of Remedial level sections taught by					
	Tenured/ tenure-eligible	Other full-time	Part-time	Graduate teaching assistants	Ukn	**Total sections**
Mathematics Departments						
Univ (PhD)	25	216	618	482	152	**1493**
	(20)	(191)	(561)	(891)		**(1663)**
Univ (MA)	120	475	807	221	149	**1772**
	(327)	(439)	(1107)	(797)		**(2670)**
Coll (BA)	1387	698	1829	26	448	**4388**
	(728)	(344)	(1808)	(33)		**(2913)**
Total	**1532**	**1389**	**3254**	**729**	**749**	**7653**
	(1075)	**(974)**	**(3476)**	**(1721)**		**(7246)**

TABLE E.14 Number of sections of Introductory level (including Precalculus) courses in Mathematics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Number of Introductory level sections taught by					
	Tenured/ tenure-eligible	Other full-time	Part-time	Graduate teaching assistants	Ukn	**Total sections**
Mathematics Departments						
Univ (PhD)	683	1159	1261	1714	215	**5032**
	(886)	(878)	(834)	(2660)		**(5258)**
Univ (MA)	2007	1747	1760	419	573	**6506**
	(2415)	(1250)	(1367)	(641)		**(5673)**
Coll (BA)	4397	1407	2676	0	507	**8987**
	(4458)	(956)	(1613)	(9)		**(7036)**
Total	**7087**	**4313**	**5697**	**2133**	**1295**	**20525**
	(7759)	**(3084)**	**(3814)**	**(3310)**		**(17967)**

TABLE E.15 Number of sections of Calculus level courses in Mathematics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Number of Calculus level sections taught by					
	Tenured/ tenure-eligible	Other full-time	Part-time	Graduate teaching assistants	Ukn	**Total sections**
Mathematics Departments						
Univ (PhD)	3522	1134	762	1087	263	**6768**
	(3576)	(702)	(451)	(1332)		**(6061)**
Univ (MA)	3053	614	652	42	190	**4551**
	(3301)	(450)	(472)	(57)		**(4280)**
Coll (BA)	4854	820	409	0	355	**6438**
	(5594)	(520)	(818)	(0)		**(6932)**
Total	**11429**	**2568**	**1823**	**1129**	**808**	**17757**
	(12471)	**(1672)**	**(1741)**	**(1389)**		**(17273)**

TABLE E.16 Number of sections of Elementary Level Statistics courses in Mathematics Departments and Statistics Departments, by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Number of Elementary Statistics sections taught by					
	Tenured/ tenure-eligible	Other full-time	Part-time	Graduate teaching assistants	Ukn	**Total sections**
Mathematics Departments						
Univ (PhD)	307 (167)	130 (27)	157 (76)	198 (281)	35	**827** **(551)**
Univ (MA)	589 (713)	146 (114)	195 (151)	20 (50)	114	**1064** **(1028)**
Coll (BA)	1087 (1451)	402 (77)	691 (423)	0 (0)	192	**2372** **(1951)**
Total Math Depts	**1983** **(2331)**	**678** **(218)**	**1043** **(650)**	**218** **(331)**	**341**	4263 (3530)
Statistics Departments						
Univ (PhD)	196 (274)	104 (130)	174 (70)	254 (274)	58	**786** **(748)**
Univ (MA)	51 (47)	23 (15)	9 (10)	11 (0)	29	**123** **(72)**
Total Stat Depts	**247** **(321)**	**127** **(145)**	**183** **(80)**	**265** **(274)**	**87**	909 (820)

TABLE E.17 Number of sections of Lower Level Computer Science courses in Mathematics Departments by type of instructor and type of school: Fall 2000 (1995 figures in parentheses).

	Number of Lower Level CS sections taught by					
	Tenured/ tenure-eligible	Other full-time	Part-time	Graduate teaching assistants	Ukn	**Total sections**
Mathematics Departments						
Univ (PhD)	41 (94)	26 (15)	8 (28)	6 (0)	11	**92 (137)**
Univ (MA)	559 (453)	204 (144)	677 (183)	0 (16)	113	**1553 (796)**
Coll (BA)	1162 (1503)	549 (290)	504 (638)	12 (0)	330	**2557 (2431)**
Total	**1762 (2050)**	**779 (449)**	**1189 (849)**	**18 (16)**	**454**	**4202 (3364)**

TABLE E.18 Number of sections of Middle Level Computer Science courses in Mathematics Departments by type of instructor and type of school in Fall 2000 (1995 figures in parentheses).

	Number of Middle Level CS sections taught by					
	Tenured/ tenure-eligible	Other full-time	Part-time	Graduate teaching assistants	Ukn	**Total sections**
Mathematics Departments						
Univ (PhD)	12 (39)	8 (3)	0 (6)	0 (0)	4	**24 (48)**
Univ (MA)	286 (166)	27 (48)	106 (31)	0 (0)	46	**465 (245)**
Coll (BA)	422 (567)	93 (75)	65 (9)	0 (0)	10	**590 (651)**
Total	**720 (772)**	**128 (126)**	**171 (46)**	**0 (0)**	**60**	**1079 (944)**

Chapter 4

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

Data Highlights

A. Size of the Faculty

Counting both part-time and full-time faculty members, the total number of mathematics department faculty in the U.S. grew by about 11% from fall 1995 to fall 2000, keeping pace with the roughly 11.6% growth in mathematics department fall enrollments (see Table E.2 in Chapter 3). However, most of this increase was due to a 35% growth in the number of part-time faculty and, looking only at the number of full-time faculty, one sees a five-year growth of only about 4%. That 4% growth in total full-time faculty was accounted for by a 65% increase in the "other full-time faculty" category consisting of full-time mathematics faculty who are neither tenured nor tenure-eligible. In fact, the number of tenured mathematics department faculty dropped by about 3% and the number of tenure-eligible faculty declined by 6% between fall 1995 and fall 2000. This represented a shift from permanent to temporary faculty in the nation's mathematics departments.

While the overall mathematics faculty grew in size between 1995 and 2000, the overall size of the national statistics faculty (both full-time and part-time) declined by about 1% even though there was an almost 14% increase in statistics department enrollments during that same period (see Table E.2 in Chapter 3). But that 1% overall decline does not show the real changes in statistics faculty patterns. Between 1995 and 2000, the total number of full-time faculty (tenured, tenure-eligible, and other full-time) in statistics departments grew by about 3% while the number of part-time faculty declined by about 34%. That 3% increase in full-time faculty masks some important changes. Between 1995 and 2000, the number of tenured faculty in statistics departments decreased by about 3% and the number of tenure-eligible faculty declined by almost 16% while the number of other full-time faculty increased by a surprising 125%. Overall, these changes in statistics department staffing could be interpreted as a shift from part-time to full-time faculty, coupled with a shift from permanent to temporary faculty.

B. Gender and Ethnicity in the Four-Year Mathematics and Statistics Faculty

The percentage of tenured women in mathematics departments rose between fall 1995 and fall 2000, and women were about 17% of the tenured mathematics faculty in fall 2000, up from about 14% in 1995. However, the percentage of women among tenure-eligible mathematics faculty dropped from about 34% in 1995 to about 31% in fall 2000. These percentages should be compared with the percentage of women in the pool of new Ph.D. recipients between 1995 and 2000, a figure that held steady at about 25% (see Table SF.8 of Chapter 1). In statistics departments, the percentage of tenured faculty who were women rose from about 5.5% in fall 1995 to about 9.3% in fall 2000, and the percentage of women among tenure-eligible faculty in statistics departments rose from about 20% in 1995 to about 34% in fall 2000.

The percentage of all mathematics department full-time faculty (i.e., tenured, tenure-eligible, and other full-time males and females) who were classified as "white, non-Hispanic" did not change much between 1995 and 2000, except in bachelors level departments where the percentage dropped from 93% to 87%. At the same time, there were noticeable changes in the percentage of all full-time faculty who were tenured, male, white, and non-Hispanic: the percentage of white, male, tenured faculty dropped by at least seven percentage points in each type of mathematics department between 1995 and 2000, while the percentage of tenured white females remained about the same (see Table F.6 in [CBMS1995] and F.6 of this chapter).

In fall 2000, the percentage of faculty in doctoral statistics departments who were "white, non-Hispanic" was 75%, unchanged from 1995, while in masters level statistics departments the percentage of white, non-Hispanic faculty had risen markedly. The percentage of the entire tenured, tenure-eligible, and other full-time faculty in doctoral statistics departments who were identified as "tenured, male" and "white, non-Hispanic" dropped by four percentage points from 1995 levels and stood at 51% in fall 2000.

As mentioned above, the number of part-time faculty in mathematics departments increased by about 35% between fall 1995 and fall 2000, while the number of part-time statistics faculty declined by about 34%. Both in mathematics and in statistics departments, 35-40% of part-time faculty members were women in fall 2000. The percentage of part-time faculty who were "white, non-Hispanic" rose in mathematics departments (to about 89%) and in statistics departments (to about 75%).

Notes on the Tables

Respondents to the CBMS2000 survey were asked to divide their faculty into four disjoint groups: tenured, tenure-eligible, other full-time, and part-time. In cases of joint appointments, an instructor was categorized as part-time or full-time depending upon the percentage of his or her time devoted to duties in the mathematics (or statistics) department, independent of positions in other units (e.g., other departments, programs, or administration). The category "other full-time" includes any full-time faculty member who was not tenured or tenure-eligible. For example, one-year or one-semester visitors, continuing instructors, and postdoctoral faculty would fall into this category. For a small percentage of the faculty, race and ethnicity data was not provided, and these faculty members are listed as "unknown" in Tables F.6 - F.8.

Tables that show percentages also show the size of the total population. For example, the penultimate column in the first block of Table F.4 contains the entry "100% 5521," meaning that for the block of tenured and tenure-eligible faculty in doctoral mathematics departments, the entire population consists of 5,521 members. Finally, a word of warning about the marginal totals in Tables F.4 to F.8: rounding off to integer percentages causes certain column or row sums to appear to be incorrect, particularly because in these tables an entry of zero means "less than one half of 1%" and the tables contain many zero entries. Rounding to tenths of percentage points would not be justified, considering the size of the Standard Error for the data in these tables.

TABLES F.1 - F.3: SIZE OF THE FOUR-YEAR FACULTY

These tables are elaborations of Tables SF.6, SF.7, and SF.8 in Chapter 1. They reveal a major shift in the national staffing pattern, and changes in the numbers and percentages of women among the U.S. mathematics and statistics faculty.

A. Staffing Shifts Toward Temporary Positions

When part-time faculty are included, the total U.S. mathematics faculty in four-year colleges and universities increased by 11% between fall 1995 and fall 2000. Even when part-time faculty members are excluded, the total mathematics faculty still grew by about 4%. However, when these numbers are analyzed more closely, a different picture appears. Between 1995 and 2000, the number of tenured faculty in mathematics departments in four-year colleges and universities dropped by about 3%, the number of tenure-eligible faculty dropped by 6%, and the number of other full-time faculty, i.e., full-time faculty members who are neither tenured nor tenure-eligible, rose by 65%.

Finer analysis of the mathematics faculty totals shows that the number of tenured faculty in doctoral departments was essentially the same in fall 2000 as in 1995, while the number of tenure-eligible faculty increased by about 4% and the number of other full-time faculty increased by 56%. In masters level departments, the number of tenured faculty fell by 5%, the number of tenure-eligible faculty increased by 6% and the number of other full-time faculty increased by 46%. In bachelors level mathematics departments, the number of tenured faculty members dropped by 7% and the number of tenure-eligible faculty declined by 16% while the number of other full-time almost doubled.

In both 1995 and 2000, the total number of faculty in statistics departments was only a small fraction of the total faculty in mathematics departments. If part-time faculty members are included, then the number of faculty in statistics departments in fall 2000 was essentially the same as in fall 1995. However, between 1995 and 2000, the number of tenured statistics faculty dropped by about 3%, the number of tenure-eligible statistics faculty dropped by 16% and the number of other full-time faculty in statistics departments more than doubled.

This shift away from tenured and tenure-eligible faculty and toward other full-time faculty represents an important change in the way that colleges and universities staffed their mathematics and statistics departments.

B. Women in Mathematics and Statistics Departments

In fall 2000, women were about 16.6% of the tenured faculty in U.S. mathematics departments, 31% of all tenure-eligible faculty, and 47% of other full-time faculty. In statistics departments, women were 9% of all tenured faculty, 33% of all tenure-eligible faculty, and 39% of all other full-time faculty.

The overall number of tenured women in mathematics departments of four-year colleges and universities grew by about 12% between 1995 and 2000. In doctoral mathematics departments, the number of tenured women grew by 7%. In masters level departments the number of tenured women increased by 21% at the same time that the total tenured faculty in those departments dropped by 5%. In bachelors-level mathematics departments, the number of tenured women grew by 8%. There was also an increase in women as a percentage of the tenured faculty, with the size of the increase ranging from one half of one percentage point in doctoral departments to more than four percentage points in masters level departments.

At the same time that the number of tenured women increased, the overall number of women in tenure-eligible mathematics department positions dropped by 16% nationally, from 1,141 in 1995 to 958 in fall 2000. In doctoral departments the number of tenure-eligible women increased by 12% and in masters level departments the increase was 6%. But that growth was more than counterbalanced by a nearly 30% drop in the number of tenure-eligible women in bachelors-level mathematics departments.

In statistics departments, the number of tenured women grew by an amazing 65% while the number of tenure-eligible women grew by 42% between 1995 and 2000.

TABLE F.1 Number of tenured, tenure-eligible, other full-time, and part-time faculty, and of female faculty (F), in Mathematics Departments and Statistics Departments by highest degree and type of school: Fall 2000 (1995 figures in parentheses).

	Univ (PhD)				Univ (MA)				Coll (BA)				
	Tenured	Tenure-eligible	Other full-time	Part-time	Tenured	Tenure-eligible	Other full-time	Part-time	Tenured	Tenure-eligible	Other full-time	Part-time	**Total**
Math Depts													
Doctoral	4693	803	685	408	2847	848	186	349	3792	1292	497	622	**17022**
	(4637)	(770)	(423)	(396)	(2821)	(750)	(235)	(222)	(3961)	(1552)	(279)	(873)	**(16919)**
Doctoral (F)	346	177	166	87	544	250	34	103	761	496	137	144	**3245**
	(317)	(158)	(66)	(91)	(397)	(199)	(60)	(56)	(539)	(651)	(48)	(134)	**(2716)**
Non-doctoral	25	0	497	868	223	14	883	2088	755	179	788	2826	**9146**
	(54)	(2)	(335)	(669)	(399)	(62)	(498)	(1234)	(907)	(193)	(370)	(1895)	**(6618)**
Non-doctoral (F)	13	0	288	438	62	0	567	824	316	35	481	1257	**4281**
	(18)	(0)	(201)	(301)	(104)	(36)	(321)	(634)	(455)	(97)	(213)	(913)	**(3293)**
Total Math	**4718**	**803**	**1182**	**1276**	**3070**	**862**	**1069**	**2437**	**4547**	**1471**	**1285**	**3448**	**26168**
	(4691)	**(772)**	**(758)**	**(1065)**	**(3220)**	**(812)**	**(733)**	**(1456)**	**(4868)**	**(1745)**	**(649)**	**(2768)**	**(23537)**
Total Math (F)	**359**	**177**	**454**	**525**	**606**	**250**	**601**	**927**	**1077**	**531**	**618**	**1401**	**7526**
	(335)	**(158)**	**(267)**	**(392)**	**(501)**	**(235)**	**(381)**	**(690)**	**(994)**	**(748)**	**(261)**	**(1047)**	**(6009)**
Stat Depts													
Doctoral	612	138	105	60	87	21	9	12					**1044**
	(647)	(171)	(33)	(90)	(79)	(20)	(3)	(6)					**(1049)**
Doctoral (F)	49	47	34	15	12	5	0	3					**165**
	(32)	(36)	(8)	(16)	(8)	(2)	(2)	(2)					**(106)**
Non-doctoral	0	0	20	15	11	2	17	3					**68**
	(2)	(0)	(23)	(32)	(2)	(0)	(8)	(8)					**(75)**
Non-doctoral (F)	0	0	14	10	5	2	11	0					**42**
	(0)	(0)	(17)	(9)	(0)	(0)	(2)	(3)					**(31)**
Total Stat	**612**	**138**	**125**	**75**	**98**	**23**	**26**	**15**					**1112**
	(649)	**(171)**	**(56)**	**(122)**	**(81)**	**(20)**	**(11)**	**(14)**					**(1124)**
Total Stat (F)	**49**	**47**	**48**	**25**	**17**	**7**	**11**	**3**					**207**
	(32)	**(36)**	**(25)**	**(25)**	**(8)**	**(2)**	**(4)**	**(5)**					**(137)**

TABLE F.2 Number of tenured, tenure-eligible, other full-time, and part-time faculty in Mathematics Departments, by gender and type of school: Fall 2000 and 1995.

	Univ (PhD)				Univ (MA)				Coll (BA)				**Total**				
	Tenured	Tenure-eligible	Other full-time	Part-time	Tenured	Tenure-eligible	Other full-time	Part-time	Tenured	Tenure-eligible	Other full-time	Part-time	Tenured	Tenure-eligible	Other full-time	Part-time	**Total**
Men, 2000	4359	626	728	751	2464	612	468	1510	3470	940	667	2047	10293	2178	1863	4308	**18642**
Women, 2000	359	177	454	525	606	250	601	927	1077	531	618	1401	2042	958	1673	2853	**7526**
Total, 2000	**4718**	**803**	**1182**	**1276**	**3070**	**862**	**1069**	**2437**	**4547**	**1471**	**1285**	**3448**	**12335**	**3136**	**3536**	**7161**	**26168**
Men, 1995	4356	614	491	673	2719	577	352	766	3874	997	388	1721	10949	2188	1231	3160	**17528**
Women, 1995	335	158	267	392	501	235	381	690	994	748	261	1047	1830	1141	909	2129	**6009**
Total, 1995	**4691**	**772**	**758**	**1065**	**3220**	**812**	**733**	**1456**	**4868**	**1745**	**649**	**2768**	**12779**	**3329**	**2140**	**5289**	**23537**

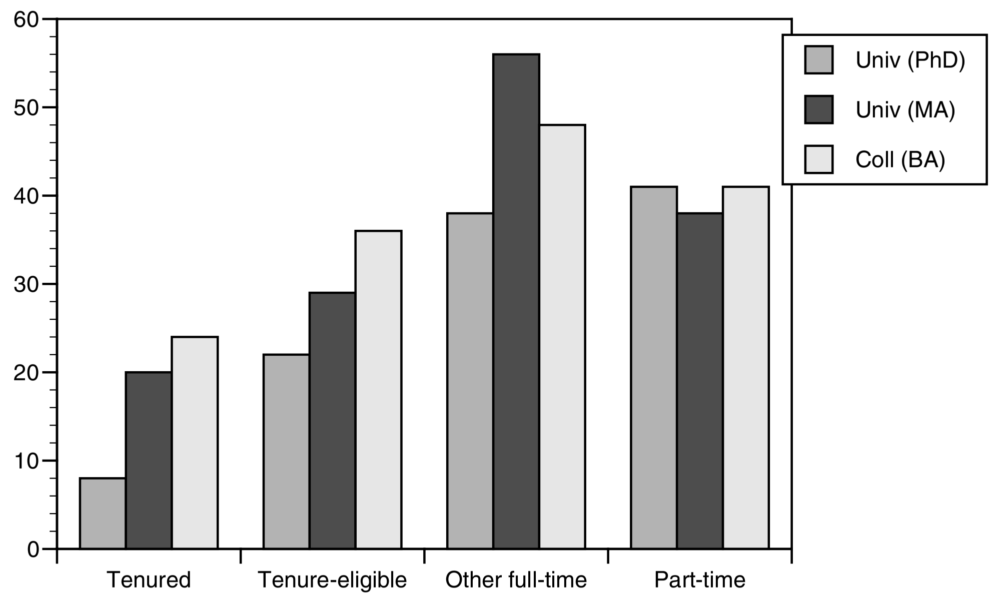

FIGURE F.2.1 Percentage of women among tenured, tenure-eligible, other full-time, and part-time faculty in Mathematics Departments, by type of school: Fall 2000.

TABLE F.3 Number of tenured, tenure-eligible, other full-time, and part-time faculty in Statistics Departments, by gender and type of school: Fall 2000 and 1995.

	Univ (PhD)				Univ (MA)				**Total**				
	Tenured	Tenure-eligible	Other full-time	Part-time	Tenured	Tenure-eligible	Other full-time	Part-time	Tenured	Tenure-eligible	Other full-time	Part-time	**Total**
Men, 2000	563	91	77	50	81	16	15	12	644	107	92	62	**905**
Women, 2000	49	47	48	25	17	7	11	3	66	54	59	28	**207**
Total, 2000	**612**	**138**	**125**	**75**	**98**	**23**	**26**	**15**	**710**	**161**	**151**	**90**	**1112**
Men, 1995	617	135	31	97	73	18	7	9	690	153	38	106	**987**
Women, 1995	32	36	25	25	8	2	4	5	40	38	29	30	**137**
Total, 1995	**649**	**171**	**56**	**122**	**81**	**20**	**11**	**14**	**730**	**191**	**67**	**136**	**1124**

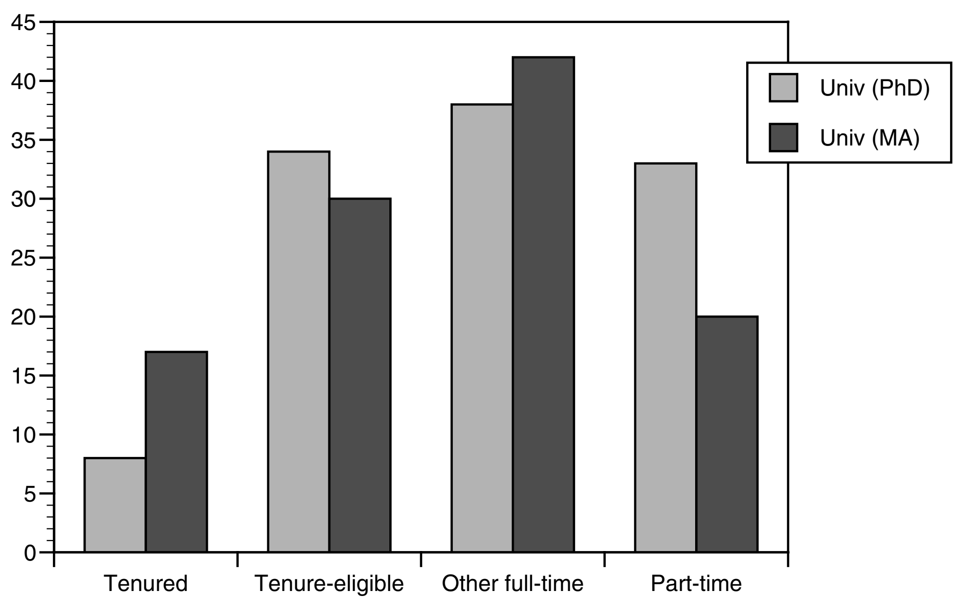

FIGURE F.3.1 Percentage of women among tenured, tenure-eligible, other full-time, and part-time faculty in Statistics Departments, by type of school: Fall 2000.

TABLES F.4 and F.5: AGE DISTRIBUTION OF THE FOUR-YEAR FACULTY

These two tables study the age distribution of the tenured and tenure-eligible faculty in mathematics departments and statistics departments of four-year colleges and universities. All table entries are percentages, with the exception of the column "Total tenured and Tenure-eligible faculty" in which, for example, the entry "100% 5521" means that in doctoral mathematics departments the total population of tenured and tenure-eligible faculty was 5,521. The percentages within each major block total 100%, except for possible round-off error. Data on the age distribution of two-year college faculty appears in Table TYR.32 of Chapter 7.

Direct comparison to Tables F.4 and F.5 of the CBMS1995 report is complicated by the fact that we shifted the age categories used in the CBMS2000 study by one year (e.g., the age category 31-35 used in the 1995 survey was replaced by 30-34 in the 2000 survey) to bring them into line with age categories used by the AMS-ASA-IMS-MAA Joint Data Committee. However, some comparisons are possible.

The average age of tenured and tenure-eligible faculty in doctoral mathematics departments dropped from 49.7 in 1995 to 47.9 in the fall of 2000. Average age in masters level departments was unchanged, and the average age of tenured and tenure-eligible faculty in bachelors level departments rose from 48.8 to 50 years. The average age for all tenured and tenure-eligible faculty members in statistics departments in fall 2000 was 48.2 years. The average age in doctoral statistics departments rose slightly, from 48.5 to 48.7 between fall 1995 and fall 2000, while the average age of tenured and tenure-eligible faculty in masters level statistics departments dropped from 50.8 in 1995 to 48.2 in 2000.

TABLE F.4 Percentage of tenured and tenure-eligible Mathematics Department faculty belonging to various age groups by type of school and gender: Fall 2000.

	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69	Total tenured & tenure-eligible faculty	Average age
Univ (PhD)												
Tenured men	0	1	6	9	14	13	15	13	5	2		52.4
Tenured women	0	0	1	1	1	1	1	0	0	0		49.6
Tenure-eligible men	1	4	3	1	0	0	0	0	0	0		36.6
Tenure-eligible women	0	1	1	0	0	0	0	0	0	0		37.8
Total Univ (PhD)	**1**	**6**	**11**	**12**	**16**	**15**	**16**	**14**	**6**	**2**	**100% 5521**[1]	**47.9**
Univ (MA)												
Tenured men	0	0	5	9	9	8	16	12	3	2		53.1
Tenured women	0	0	2	3	3	4	2	1	0	1		49.2
Tenure-eligible men	1	5	5	2	0	1	0	0	0	0		37.5
Tenure-eligible women	1	2	1	2	1	0	0	0	0	0		38.8
Total Univ (MA)	**2**	**7**	**13**	**16**	**13**	**13**	**18**	**13**	**3**	**2**	**100% 3932**[1]	**49.1**
Coll (BA)												
Tenured men	0	2	3	6	10	11	14	9	2	1		52.7
Tenured women	0	1	1	2	4	2	3	2	0	0		47.3
Tenure-eligible men	1	5	6	2	0	0	1	0	0	0		35.8
Tenure-eligible women	1	4	1	2	0	1	0	0	0	0		36.6
Total Coll (BA)	**3**	**12**	**11**	**12**	**14**	**15**	**19**	**10**	**2**	**1**	**100% 6018**[1]	**50**

Note: 0 means less than half of 1%.

[1] Total for all four rows in this block.

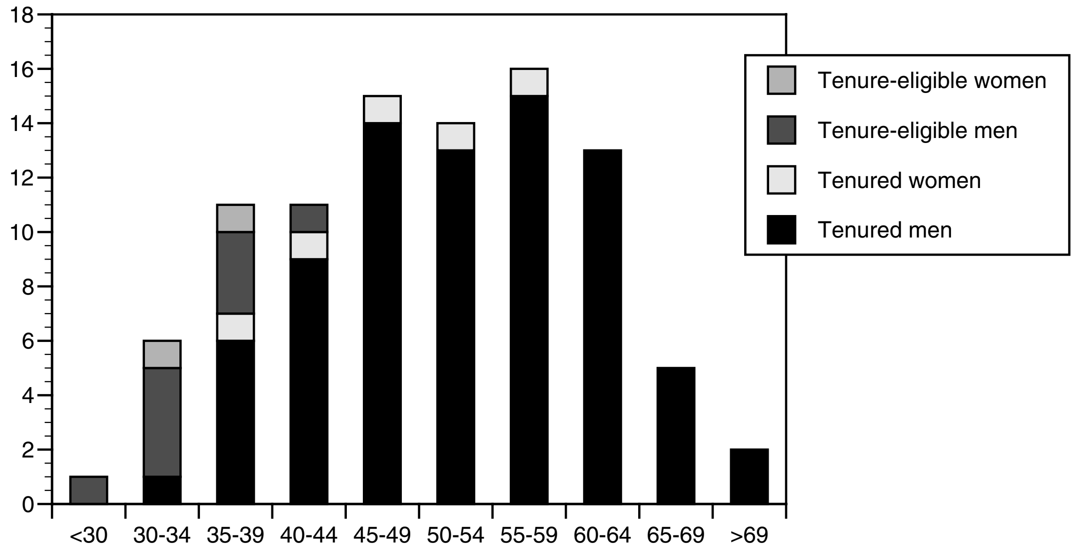

FIGURE F.4.1 Percentage of tenured and tenure-eligible faculty in Mathematics Departments with Ph.D. programs by gender: Fall 2000. (Total tenured and tenure-eligible faculty in these departments = 5521.)

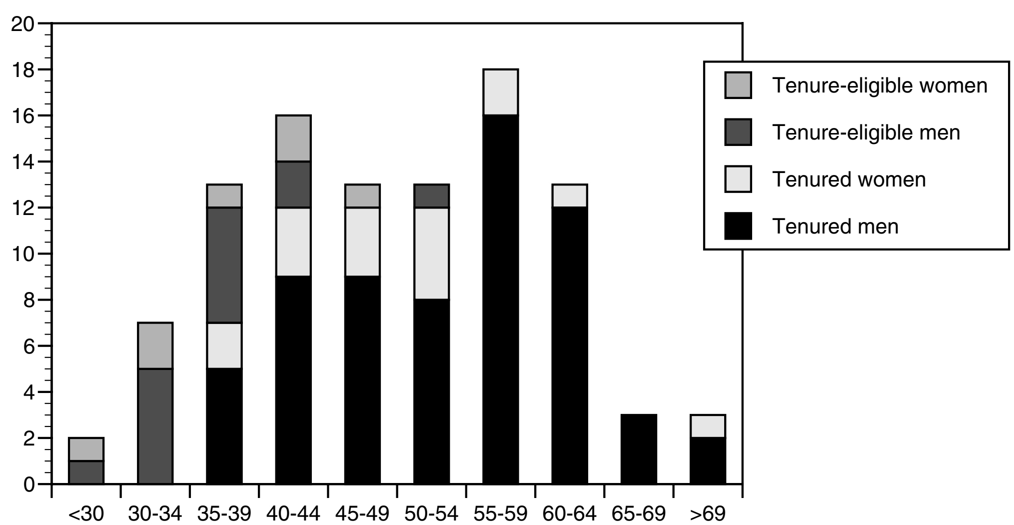

FIGURE F.4.2 Percentage of tenured and tenure-eligible faculty in Mathematics Departments with MA programs, but not Ph.D. programs, by gender: Fall 2000. (Total tenured and tenure-eligible faculty in these departments = 3932.)

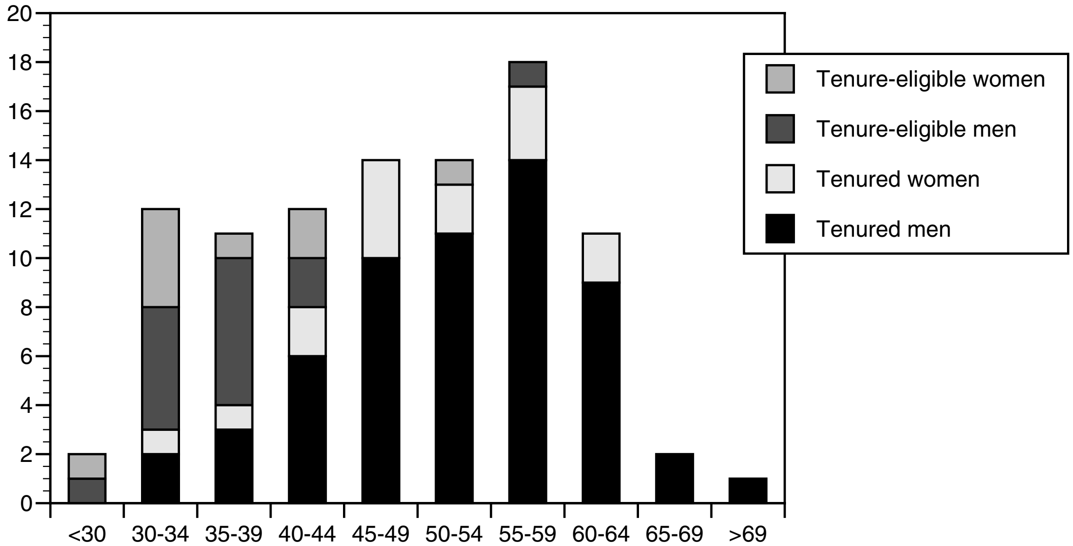

FIGURE F.4.3 Percentage of tenured and tenure-eligible faculty in Mathematics Departments with BA programs only, by gender: Fall 2000. (Total tenured and tenure-eligible faculty in these departments = 6018.)

TABLE F.5 Percentage of tenured and tenure-eligible Statistics Department faculty belonging to various age groups by type of school and gender: Fall 2000.

	<30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69	Total tenured & tenure-eligible faculty		Average age
Univ (PhD)													
Tenured men	0	1	5	10	15	12	15	11	3	3			52.6
Tenured women	0	0	1	2	1	1	0	0	0	0			48.3
Tenure-eligible men	3	6	2	0	0	0	0	0	0	0			34.4
Tenure-eligible women	1	4	1	1	0	0	0	0	0	0			38
Total Univ (PhD)	**4**	**11**	**9**	**14**	**16**	**13**	**15**	**11**	**4**	**3**	**100%**	**750**[1]	**48.7**
Univ (MA)													
Tenured men	0	0	1	8	12	18	18	9	0	1			52.2
Tenured women	0	0	0	3	4	3	1	0	0	0			43.8
Tenure-eligible men	3	3	8	0	0	0	0	0	0	0			32.6
Tenure-eligible women	0	3	1	1	1	0	0	0	0	0			33.9
Total Univ (MA)	**3**	**6**	**11**	**12**	**17**	**22**	**19**	**9**	**0**	**1**	**100%**	**121**[1]	**48.2**

Note: 0 means less than half of 1%.

[1] Total for all four rows in this block.

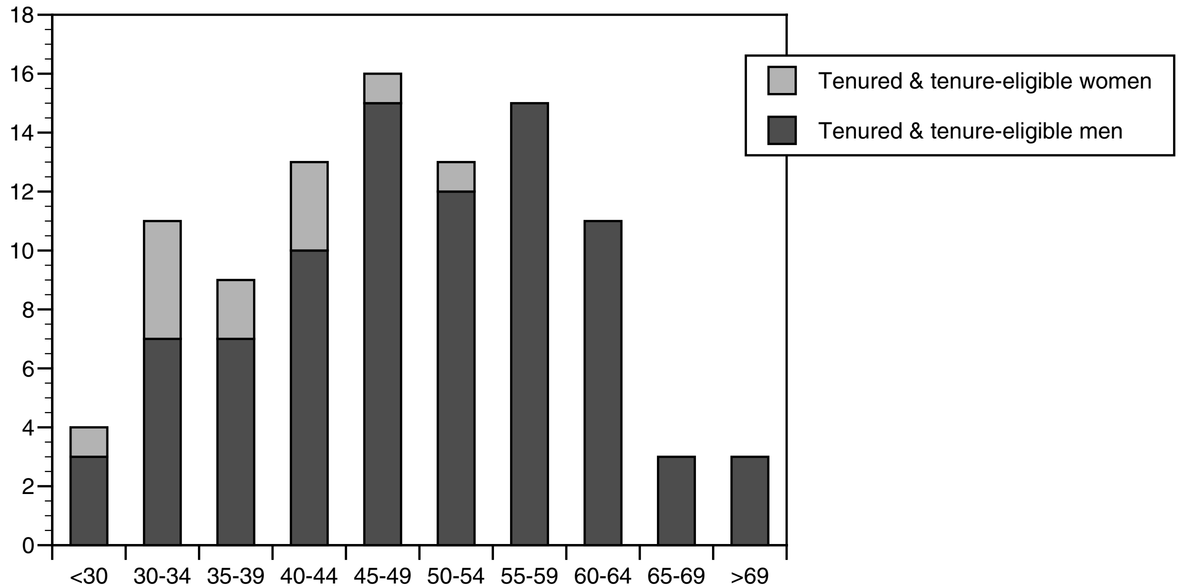

FIGURE F.5.1 Percentage of tenured and tenure-eligible faculty in doctoral Statistics Departments belonging to various age groups by gender: Fall 2000.

TABLES F.6 and F.7: RACE, ETHNICITY, AND GENDER OF FULL-TIME FACULTY

These tables are an elaboration of Tables SF.11 and SF.12 in Chapter 1. They show the percentage of all full-time faculty in various kinds of four-year departments who belong to various ethnic groups and who hold various types of appointments. The percentages within each major box in the tables total 100%, except possibly for rounding-induced errors, and the final column shows the total number of full-time faculty in various types of departments.

Comparison of these tables with corresponding tables from the CBMS1995 survey shows several demographic shifts, discussed below. In interpreting these shifts, it is useful to remember that the total number of full-time faculty in mathematics departments increased by about 4% nationally between fall 1995 and fall 2000. In doctoral departments, the number rose from 6,221 to 6,703 (+7.7%) and in masters level departments, the total rose from 4,765 to 5,001 (+5%). Bachelors-level departments saw the smallest increase, from 7,262 in fall 1995 to 7,303 in fall 2000 (about three-fifths of 1%).

Data detailing the ethnic composition of the four-year mathematics faculty appear in Table SF.11. Nationally, about 84% of the total full-time mathematics faculty were "white, not Hispanic" in fall 2000, about three percentage points lower than in 1995, but that percentage and rate of change varies from one kind of department to another. In doctoral and masters level mathematics departments 82% of all full-time faculty were white in fall 2000 and there was little change from 1995 levels, while in bachelors-level mathematics departments, the percentage of full-time faculty who were white dropped from 93% in 1995 to 87% in 2000. Nationwide, the percentage of Asians among all full-time mathematics faculty stood at about 10% in fall 2000, up from 8% in 1995. The percentage of Asians among doctoral department full-time faculty rose from 12% to 14% over the same five year period, while the corresponding percentage in masters level mathematics departments dropped from 11% to 10%. In bachelors-level mathematics departments, the percentage of Asians among the full-time faculty rose from 4% to 7%. Nationally, the percentage of Hispanics among full-time faculty was about 3% in fall 2000, up from 1% in 1995. The percentage of Hispanic faculty in doctoral mathematics departments dropped from 2% to 1%, and in masters level departments rose from 1% in 1995 to 6% in 2000. Nationally, the percentage of black non-Hispanic full-time faculty stood at 2% in 2000, just as in 1995. In doctoral and bachelors mathematics departments, the percentage of black non-Hispanic faculty was unchanged from 1995 levels and dropped from 3% to 2% in masters level mathematics departments.

Perhaps the most notable demographic change in the national mathematics department faculty between fall 1995 and fall 2000 is that the percentage of full-time faculty who belong to both the "white, not Hispanic" and "male" groups dropped by about six percentage points (see Table SF.11). In doctoral and masters level mathematics departments, the percentage dropped by about four points, while in bachelors-level mathematics departments, the percentage declined from 70% to 60%. If one considers only tenured faculty members, some of the percentage changes were even larger. For example, the percentage of full-time faculty who belonged to the tenured, white, male category dropped from 61% to 54% in doctoral departments, from 48% to 41% in masters level departments, and from 52% to 40% in bachelors-level mathematics departments during the last five years of the 1990s.

The percentage of women in all mathematics departments of four-year colleges and universities rose between 1995 and 2000, from 20% to 24% (see Table SF.11). In doctoral departments, the percentage of women increased from 11% to 14% of the full-time faculty; in masters level departments, the percentage rose from 23% to 29%, and in bachelors-level departments, the increase was from 26% to 29%. For comparison, recall that the percentage of women among new mathematical sciences Ph.D. recipients held steady at about 25% between 1995 and 2000 (see Table SF.8 in Chapter 1).

In both the CBMS1995 and CBMS2000 surveys, the number of full-time faculty in doctoral statistics departments was estimated as being 876, while the number of full-time faculty in masters level statistics departments grew from 112 to 147. In fall 2000 the nation's doctoral statistics faculty was about 75% white, approximately the same as five years earlier. In masters level statistics departments, the percentage of full-time faculty who are white increased from 73% to 86% during the same five year period.

TABLE F.6 Percentage of gender and racial/ethnic groups among tenured, tenure-eligible, and other full-time faculty in Mathematics Departments by school type: Fall 2000.

	Percentage of full-time faculty						
	American Indian/ Alaskan	Asian/ Pacific Islander	Black, not Hispanic	Mexican American/ Puerto Rican/ other Hispanic	White, not Hispanic	Not known	Number of tenured, tenure-eligible, & other full-time faculty
Univ (PhD)							
Tenured men	0	9	1	1	54	1	
Tenured women	0	1	0	0	4	0	
Tenure-eligible men	0	3	0	0	6	0	
Tenure-eligible women	0	0	0	0	2	0	
Other full-time men	0	1	0	0	9	0	
Other full-time women	0	0	0	0	7	0	
All full-time men	**0**	**13**	**1**	**1**	**69**	**1**	
All full-time women	**0**	**1**	**0**	**0**	**13**	**0**	**100% 6703**[1]
Univ (MA)							
Tenured men	0	6	1	2	41	0	
Tenured women	0	1	0	1	10	0	
Tenure-eligible men	0	2	0	1	9	0	
Tenure-eligible women	0	0	0	1	3	0	
Other full-time men	0	1	0	0	8	0	
Other full-time women	0	1	0	1	10	0	
All full-time men	**0**	**8**	**1**	**4**	**58**	**1**	
All full-time women	**0**	**2**	**1**	**2**	**24**	**0**	**100% 5001**[1]
Coll (BA)							
Tenured men	0	4	2	0	40	0	
Tenured women	0	2	0	0	13	0	
Tenure-eligible men	0	1	0	0	11	0	
Tenure-eligible women	0	0	0	0	6	0	
Other full-time men	0	0	0	0	9	0	
Other full-time women	0	0	0	0	8	0	
All full-time men	**0**	**5**	**3**	**1**	**60**	**1**	
All full-time women	**0**	**2**	**0**	**0**	**27**	**0**	**100% 7303**[1]

Note: 0 means less than half of 1%.

[1] Total for all men and women in block.

TABLE F.7 Percentage of gender and racial/ethnic groups among tenured, tenure-eligible, and other full-time faculty in Statistics Departments by school type: Fall 2000.

	Percentage of full-time faculty						
	American Indian/ Alaskan	Asian/ Pacific Islander	Black, not Hispanic	Mexican American/ Puerto Rican/ other Hispanic	White, not Hispanic	Not known	Number of tenured, tenure-eligible, & other full-time faculty
Univ (PhD)							
Tenured men	0	11	0	0	51	3	
Tenured women	0	1	0	0	4	0	
Tenure-eligible men	0	4	0	0	6	1	
Tenure-eligible women	0	2	0	0	3	0	
Other full-time men	0	2	0	0	6	0	
Other full-time women	0	1	0	0	5	0	
All full-time men	**0**	**17**	**0**	**0**	**63**	**4**	
All full-time women	**0**	**4**	**0**	**0**	**12**	**0**	**100% 875**[1]
Univ (MA)							
Tenured men	0	3	1	3	46	0	
Tenured women	0	1	0	0	7	0	
Tenure-eligible men	0	2	0	0	9	0	
Tenure-eligible women	0	2	0	0	2	0	
Other full-time men	0	2	0	0	10	0	
Other full-time women	0	0	0	0	10	0	
All full-time men	**0**	**7**	**1**	**3**	**66**	**0**	
All full-time women	**0**	**3**	**0**	**0**	**20**	**0**	**100% 147**[1]

Note: 0 means less than half of 1%.

[1] Total for all men and women in block.

TABLE F.8: RACE, ETHNICITY, AND GENDER OF PART-TIME FACULTY IN FOUR-YEAR COLLEGES AND UNIVERSITIES

This table is an elaboration of Tables SF.13 and SF.14 in Chapter 1. It shows the percentages of all part-time faculty members in a given type of department who belong to various ethnic and gender groups. The percentages within each of the major boxes total 100%, except possibly for rounding-induced errors. The final column shows the total number of part-time faculty in various types of departments. The total number of part-time faculty in mathematics in fall 2000 is estimated to be 7,161, up substantially from the 5,289 part-time mathematics faculty in fall 1995.

In fall 2000, 9% of the total part-time mathematics department faculty were identified as being Asian, black, or Hispanic, just as in 1995. In 1995, 84% of all part-time mathematics faculty members were white; by 2000, that percentage had risen to about 89%.

The percentage of women among all part-time mathematics faculty in fall 2000 remained unchanged from the 40% level in 1995. The percentage of white women rose from 33% in 1995 to 36% in 2000.

The number of part-time faculty in statistics departments remained small, decreasing from 136 in fall 1995 to 90 in fall 2000. In fall 2000, about 27% of these were Asian, black, or Hispanic, compared with 31% in 1995. The percentage of women among part-time statistics faculty was 19% in fall 1995, and stood at about 35% in fall 2000.

TABLE F.8 Percentage of gender and racial/ethnic groups among part-time faculty in Mathematics Departments and Statistics Departments by school type: Fall 2000.

	Percentage of part-time faculty						
	American Indian/ Alaskan %	Asian/ Pacific Islander %	Black, not Hispanic %	Mexican American/ Puerto Rican/ other Hispanic %	White, not Hispanic %	Not known %	Number of part-time faculty
Math Depts							
Univ (PhD)							
Part-time men	0	3	2	1	51	2	
Part-time women	0	2	1	1	37	1	1276[1]
Univ (MA)							
Part-time men	0	4	2	3	52	2	
Part-time women	0	1	0	3	32	1	2437[1]
Coll (BA)							
Part-time men	1	1	1	1	54	2	
Part-time women	0	1	1	0	39	0	3448[1]
Total part-time men	**0**	**2**	**2**	**2**	**53**	**2**	
Total part-time women	**0**	**1**	**1**	**1**	**36**	**1**	**7161**[1]
Stat Depts							
Univ (PhD)							
Part-time men	0	18	0	0	45	0	
Part-time women	0	7	0	2	28	0	75[1]
Univ (MA)							
Part-time men	0	10	0	10	60	0	
Part-time women	0	0	0	0	20	0	15[1]
Total part-time men	**0**	**17**	**0**	**2**	**48**	**0**	
Total part-time women	**0**	**6**	**0**	**2**	**27**	**0**	**90**[1]

Note: 0 means less than half of 1%.

[1] Total for all men and women in block.

Chapter 5

First-Year Calculus and Statistics Courses in Four-Year Colleges and Universities

Data Highlights

The eight tables in this chapter present details concerning first-year courses in calculus and statistics taught in four-year colleges and universities. Mainstream and non-mainstream calculus are studied separately, as are elementary statistics courses taught in mathematics departments and in statistics departments. ("Mainstream calculus" refers to those calculus courses that lead to the usual upper division mathematical sciences courses; all others are called "non-mainstream calculus.") In each case, the tables present data answering the two broad questions "Who teaches these courses?" and "How are these courses taught?" Sections of Chapter 6 study the same questions in the two-year college environment.

A. Who Teaches First-Year Courses?

Between fall 1995 and fall 2000, there was a substantial decline in the percentage of mainstream Calculus I enrollments taught by tenured and tenure-eligible faculty. Even though other full-time faculty (i.e., full-time faculty who are not tenured and not tenure-eligible) took up part of the slack, it is still true to say that the percentage of Calculus I enrollments taught by full-time faculty of all kinds dropped in every type of department, with the percentage dropping by about seven percentage points in masters and doctoral mathematics departments and by four percentage points in bachelors level departments. The percentage of mainstream Calculus I enrollments taught by part-time faculty in masters and doctoral departments rose between 1995 and 2000, and the percentage taught by graduate teaching assistants was essentially unchanged. Similar percentage shifts occurred in the teaching of mainstream Calculus II.

During the same five year period, there was a ten point increase in the percentage of enrollment in elementary statistics courses taught by tenured and tenure-eligible faculty in doctoral mathematics departments, while in masters and bachelors mathematics departments and in doctoral statistics departments the percentage dropped substantially. Looking at the percentages of enrollment taught by full-time faculty of all types, one sees a nine point rise in doctoral mathematics departments, a nine point drop in doctoral statistics departments, and double digit declines in masters and bachelors mathematics departments between 1995 and 2000. At the same time, the percentage of elementary statistics courses taught by graduate teaching assistants dropped substantially in masters and doctoral mathematics departments, and in doctoral statistics departments.

B. How Are First-Year Courses Taught?

To determine how a given course is taught, the CBMS2000 survey asked departments to report on the number of sections taught:

1) using graphing calculators,
2) with writing components such as reports or projects,
3) using required computer assignments,
4) with assigned group projects,
5) at least once per week in a setting that requires student computer use, e.g., in a computer lab.

The first four items appeared on the CBMS1995 survey, along with another option "taught using a reform text" that was defined as "the primary text or set of notes generally reflect the pedagogical principles of the calculus reform movement." In 1995, the term "reform text" was relatively well-defined, but by fall 2000 the distinction between reformed and non-reformed texts was no longer clear, with textbook publishers advertising almost all of their books as containing various components of the calculus reform movement. Consequently the reform-text question was dropped and replaced by the fifth question above.

One goal of the five questions above was to track the spread of the pedagogical reforms that were advocated by the calculus reform movement. At the suggestion of several professional society committees, the CBMS2000 survey asked the same five questions about how first-year calculus and elementary statistics were taught in two-year colleges, and the results are studied in Chapter 6.

In fall 2000, distance learning was another relatively new method for teaching undergraduate mathematics, and CBMS2000 was the first CBMS survey to ask about courses taught in that way. Data on distance learning appear in Chapter 2.

By fall 2000, every type of mathematics department used both graphing calculators and required computer assignments to a greater degree in calculus teaching than in 1995. The use of writing assignments and group projects also continued to expand in masters and bachelors departments, while in doctoral mathematics departments the use of the latter two reform pedagogies actually declined.

Calculus reform pedagogies were used in elementary statistics courses as well as in calculus courses. In fall 2000, graphing calculator use was lower in statistics courses than in calculus courses, while writing assignments, computer assignments, and weekly computer labs were more common in elementary statistics than in calculus courses. Statistics departments seemed to place less emphasis on graphing calculator use, and considerably more emphasis on computer assignments and weekly computer labs than did mathematics departments.

Notes on the Tables

Intuition suggests that who teaches a given course or section, and how it is taught, may be influenced by the size of the section. To minimize variation based on section size, CBMS2000 divided sections of first-year courses into three types, namely: sections taught as lectures with separately scheduled recitation or problem sessions; other sections of size 35 or less, and other sections with size above 35. To determine who teaches first-year courses in calculus and statistics, we divided instructors into four types: tenured and tenure-eligible, other full-time faculty, part-time faculty, and graduate teaching assistants. As in previous CBMS surveys, departments were asked to count a lecture section along with all of its recitations as a single class and to record a section as having been taught by a graduate teaching assistant if and only if the graduate teaching assistant taught the section independently.

Unfortunately, respondents to the CBMS2000 survey did not always report the instructors for all of their sections, and as a result we created an “Unknown Instructor” category in tables that report data on who teaches first-year courses. Part of the unknown instructor problem can be explained by the fact that “distance learning” sections (see Chapter 2) were included in the section count, but not categorized by type of instructor. However, the percentage of first-year courses taught by distance learning was not nearly large enough to account for the unknown instructor percentages found in this chapter’s tables. In some cases, the unknown instructor percentage is so high that it makes comparisons with 1995 data suspect. The most extreme cases of this problem occur in situations where the total national enrollment in a type of course (e.g., lecture/recitation sections taught in bachelors level mathematics departments) is quite small.

The tables in this chapter follow the pattern established in the CBMS 1995 report, giving percentages of enrollment rather than percentages of sections. Estimating enrollment percentages presented special problems and we followed the methodology introduced in the 1995 survey. See Appendix II of this report for a discussion of the statistical methodology involved. Tables E.12 through E.18 in Chapter 3 report on numbers and percentages of sections, have smaller unknowns, and generally corroborate the data in this chapter’s tables.

TABLE FY.1: WHO TEACHES MAINSTREAM CALCULUS?

This table presents data on the question "Who teaches mainstream Calculus I and II?" It gives estimates of the percentage of enrollments taught by various types of instructors in different types of sections in departments with the Ph.D., MA, or BA as their highest offered degree. The percentages sum to 100% (except for round-off errors) in a complicated pattern. For example, consider lecture/recitation sections taught in doctoral departments. Table FY.1 shows that 58% of such sections were taught by tenured and tenure-eligible faculty, 23% by other full-time faculty, 10% by part-time faculty, 8% by graduate teaching assistants, and 1% by unknown instructors.

A. Mainstream Calculus I

Comparison with the corresponding table in CBMS1995 shows that between 1995 and 2000, there was a change in who taught mainstream Calculus I. The percentage of mainstream calculus enrollment taught by tenured and tenure-eligible faculty dropped in doctoral, masters, and bachelors departments. In fall 1995 the percentages of mainstream Calculus I enrollments taught by tenured and tenure-eligible faculty were 62%, 77%, and 84% respectively, and the corresponding percentages in fall 2000 were 50%, 64%, and 73%, a decline of about 12 percentage points in each type of school. If one combines the percentages of mainstream Calculus I students taught by tenured, tenure-eligible, and other full-time faculty, one sees a decline in each type of department over the past five years. In fall 1995, the percentages of mainstream Calculus I students taught by full-time faculty of all types were 78%, 89%, and 90% in doctoral, masters, and bachelors departments respectively. By fall 2000 the corresponding percentages had dropped to 71%, 81%, and 86%. The percentage of enrollment taught by part-time faculty rose by about 5 points in doctoral and in masters departments and fell by about 3 points in bachelors level departments. The fall 2000 percentages of enrollment taught by graduate teaching assistants were essentially unchanged from the levels of fall 1995.

There was essentially no change between 1995 and 2000 in the number of students enrolled in fall sections of mainstream Calculus I. In that five year period, overall fall enrollment in mainstream Calculus I rose slightly in doctoral departments, was unchanged in masters departments, and fell off by about 7,000 students (about 11%) in bachelors departments.

Overall average section sizes in mainstream Calculus I declined slightly between 1995 and 2000. However, when one looks at average section sizes in courses taught using lecture/recitation format, one sees some substantial decreases. The average section size in lecture/recitation courses in doctoral departments dropped from 100 in 1995 to 60 in fall 2000, and the average section size of lecture/recitation sections in masters level departments dropped from 84 in fall 1995 to 31 in fall 2000. Another change is worth noting: in fall 1995, bachelors level departments reported teaching no students in lecture/recitation format, but in fall 2000 there were about 9,000 students enrolled in lecture/recitation sections of mainstream Calculus I in bachelors-only departments, with an average section size of 25.

B. Mainstream Calculus II

As in mainstream Calculus I, between 1995 and 2000 there was a shift away from the use of tenured and tenure-eligible faculty to teach mainstream Calculus II. In doctoral departments, the percentage of enrollment taught by tenured and tenure-eligible faculty dropped from 59% in fall 1995 to 56% in fall 2000. The drop off in masters level departments was more pronounced, going from 84% to 71%. The decline in bachelors level departments was from 88% in fall 1995 to 81% in fall 2000.

If one combines the percentages of mainstream Calculus II students taught by tenured, tenure-eligible, and other full-time faculty, one finds that the fall 2000 percentage in doctoral departments was essentially unchanged from 1995 levels while the percentages in bachelors and masters departments dropped by at least ten percentage points. There were increases in the percentages of students taught by part-time faculty.

In contrast with the fact that the overall enrollment in mainstream Calculus I was unchanged between fall 1995 and fall 2000, during that five year period there was a 6% rise in mainstream Calculus II fall enrollments (from 83,000 to 88,000). This might represent a shift in students' initial college calculus course due to the spread of Calculus I courses in high school.

Overall average section sizes in mainstream Calculus II did not change much between 1995 and 2000. However, as with Calculus I, there was a marked decline in average section size of lecture/recitation format courses in doctoral departments — a decline from 84 in fall 1995 to 66 in fall 2000. Also as in Calculus I, bachelors level departments began reporting the use of lecture/recitation format in mainstream Calculus II, something they had not done in 1995. Nationally, in fall 2000 about 3,000 students were enrolled in lecture/recitation sections of mainstream Calculus II in bachelors level departments, with average section size 20, while in fall 1995 there were none. As was the case with mainstream Calculus I, the small size of lecture/recitation sections in bachelors level departments suggests that they were of quite a different type than lecture/recitation sections in doctoral departments.

C. Enrollment Increases in Later Mainstream Calculus Courses

Although this chapter deals only with first-year courses, it may be important to note that enrollment in later calculus courses (Calculus III and IV) rose from 62,000 in fall 1995 to 73,000 in fall 2000 (see Appendix I). That is an increase of almost 18% and may predict future increases in advanced-level mathematics and statistics enrollments.

TABLE FY.1 Percentage of enrollment in Mainstream Calculus I and Mainstream Calculus II taught by tenured/tenure-eligible, other full-time, part-time faculty, graduate teaching assistants, and unknown instructors in Mathematics Departments by size of sections and type of school: Fall 2000, and historical data. Also total enrollments (in 1000s) and average section sizes.

	Percentage of enrollment taught by															Enrollment in 1000s			Average section size		
	Tenured/ tenure-eligible %			Other full- time %			Part-time %			Graduate teaching assistants %			Unknown %								
Course	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	58	67	78	23	3	2	10	16	4	8	13	0	1	1	16	53	6	9	60	31	25
Regular section <36	38	67	71	19	16	15	14	13	9	22	2	0	7	2	5	20	26	45	27	27	22
Regular section >35	39	53	76	20	26	18	19	14	4	21	0	0	1	7	2	16	10	5	43	38	37
Total Mainstream Calculus I	**50**	**64**	**73**	**21**	**17**	**13**	**12**	**14**	**7**	**14**	**3**	**0**	**3**	**2**	**7**	**89**	**42**	**59**	**44**	**29**	**23**
1995 data	62	77	84	16	12	6	7	9	10	15	2	0				84	42	66	47	30	25
Mainstream Calculus II																					
Lecture/ recitation	62	76	60	21	0	0	6	24	8	6	0	0	5	0	32	23	2	3	66	24	20
Regular section <36	48	68	84	15	9	8	14	21	5	19	0	0	4	2	3	15	12	19	27	26	23
Regular section >35	53	78	0	11	16	0	12	0	0	23	0	0	1	6	0	9	4	0	46	34	0
Total Mainstream Calculus II	**56**	**71**	**81**	**17**	**10**	**7**	**10**	**16**	**6**	**13**	**0**	**0**	**4**	**3**	**5**	**48**	**18**	**22**	**43**	**27**	**22**
1995 data	59	84	88	13	11	10	7	5	2	20	0	0				42	16	25	43	28	20
Total Mainstream Calculus I & II	**52**	**66**	**75**	**20**	**14**	**12**	**11**	**14**	**7**	**14**	**2**	**0**	**5**	**4**	**6**	**136**	**60**	**82**	**44**	**29**	**23**
1995 data	61	79	85	15	12	7	7	8	8	17	0	0				126	58	91	46	29	23

Note: 0 means less than one half of 1% in columns 1 through 5, and less than 500 enrollment in column 6.

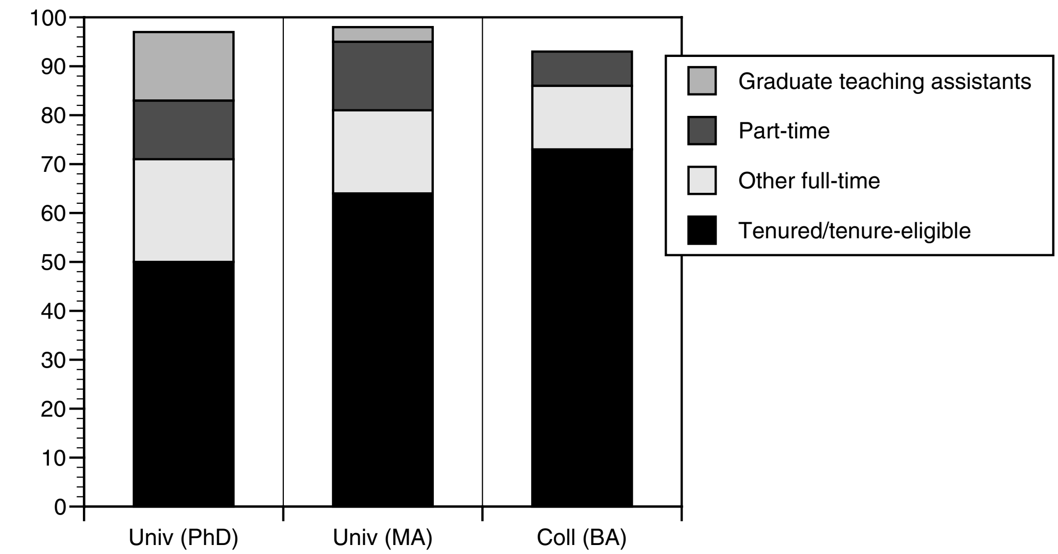

FIGURE FY.1.1 Percentage of enrollment in Mainstream Calculus I in Mathematics Departments by type of instructor and type of school: Fall 2000. (Deficits from 100% represent unknown instructors.)

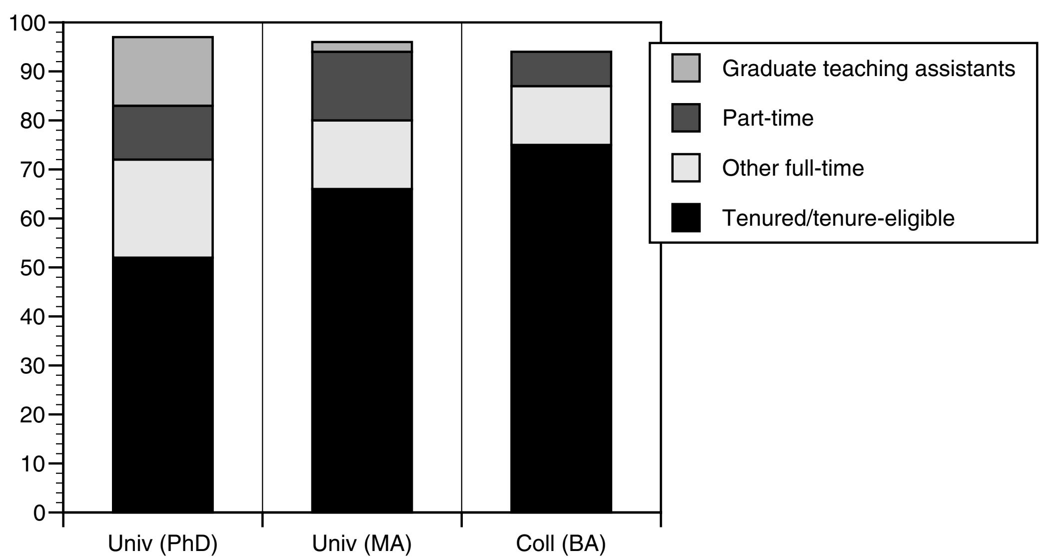

FIGURE FY.1.2 Percentage of enrollment in Mainstream Calculus II in Mathematics Departments by type of instructor and type of school: Fall 2000. (Deficits from 100% total represent unknown instructors.)

TABLE FY.2: HOW IS MAINSTREAM CALCULUS TAUGHT?

This table shows the percentage of enrollment in mainstream Calculus I and II taught using five reform pedagogies:

a) graphing calculators

b) writing assignments

c) computer assignments

d) group projects

e) meeting at least once each week in a setting that requires student computer use.

TABLE FY.2 Percentage of enrollment in Mainstream Calculus I & II taught using various reform methods in Mathematics Departments by type of section and type of school: Fall 2000, plus historical data. Also total enrollments (in 1000s) and average section size.

	Percentage of Mainstream Calculus I & II enrollment taught using															Enrollment in 1000s			Average section size		
	Graphing calculators %			Writing assignments %			Computer assignments %			Group projects %			Weekly computer lab %								
	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	35	43	65	16	40	55	17	0	46	5	40	49	14	0	44	53	6	9	60	31	25
Regular section <36	46	64	66	16	22	39	27	35	38	11	20	27	9	11	25	20	26	45	27	27	22
Regular section >35	47	38	81	34	5	72	36	56	58	25	2	61	20	0	20	16	10	5	43	38	37
Total Mainstream Calculus I	**40**	**55**	**67**	**19**	**20**	**45**	**23**	**35**	**41**	**10**	**18**	**33**	**14**	**7**	**27**	**89**	**42**	**59**	**44**	**29**	**23**
1995 data	33	44	39	21	16	27	15	21	20	21	16	28	na	na	na	84	42	66	47	30	25
1990 data	3	3	2	2	2	21	5	8	14	1	2	5	na	na	na	na	na	na	na	na	na
Mainstream Calculus II																					
Lecture/recitation	41	95	51	5	95	69	18	0	64	2	95	64	14	0	64	23	2	3	66	24	20
Regular section <36	52	60	50	13	10	26	17	26	31	10	10	26	8	7	18	15	12	19	27	26	23
Regular section >35	28	45	0	29	0	0	43	35	0	16	0	0	17	3	0	9	4	0	46	34	0
Total Mainstream Calculus II	**42**	**59**	**50**	**12**	**15**	**32**	**23**	**26**	**35**	**8**	**15**	**31**	**13**	**5**	**23**	**48**	**18**	**22**	**43**	**27**	**22**
1995 data	27	32	32	17	11	42	15	18	20	15	12	31	na	na	na	42	16	25	43	28	20
1990 data	3	1	2	2	1	23	3	7	10	1	1	3	na	na	na	na	na	na	na	na	na
Total Mainstream Calculus I&II	**40**	**56**	**62**	**17**	**19**	**41**	**23**	**33**	**39**	**9**	**18**	**33**	**14**	**6**	**26**	**136**	**60**	**82**	**44**	**29**	**23**

Note: 0 means less than one half of 1% in columns 1 through 5, and less than 500 enrollments in column 6.

As in Table FY.1, sections are divided into those taught in lecture/recitation mode, those taught in regular sections of size 35 or less, and those taught in regular sections of size greater than 35.

Certain patterns are evident in Table FY.2. In Calculus I, bachelors level departments reported higher use of each of the five reform pedagogies than did departments having graduate programs, and doctoral departments reported the lowest use. In Calculus II, there appeared to be less use of reform pedagogies than in Calculus I. As in Calculus I, bachelors departments reported more use of four of the five reform pedagogies than departments with graduate programs.

Comparison of CBMS2000 findings with historical data from 1990 and 1995 shows a steady rise in the use of graphing calculators and computer assignments in every type of department, often with double digit increases over five years. The use of writing assignments and group projects did not grow as quickly, and in doctoral departments actually declined during the last five years of the 1990s. In mainstream Calculus II, the use of writing assignments was down, even in bachelors level departments.

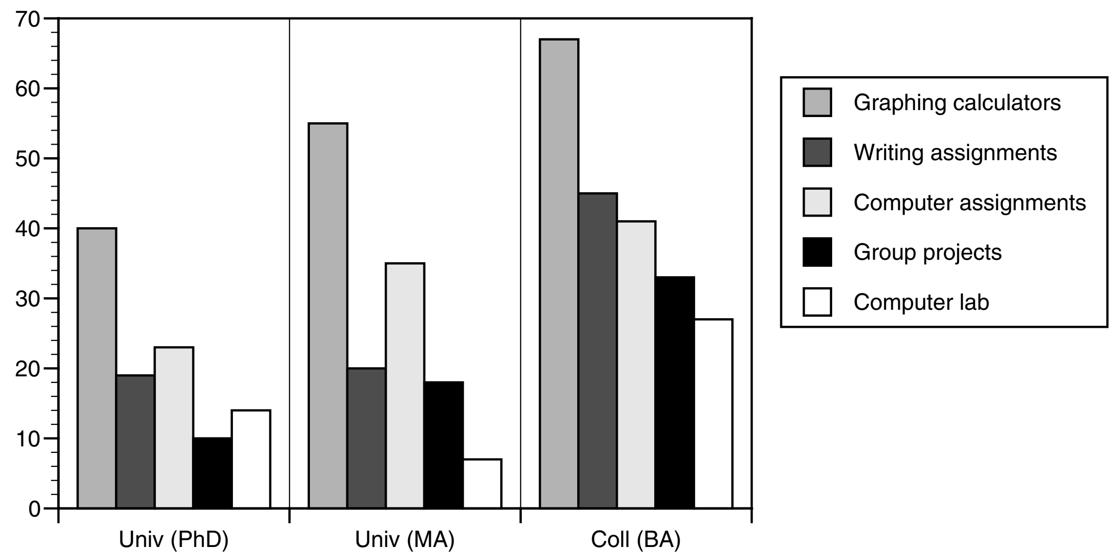

FIGURE FY.2.1 Percentage of enrollment in Mainstream Calculus I taught using various reform methods in Mathematics Departments by type of school: Fall 2000.

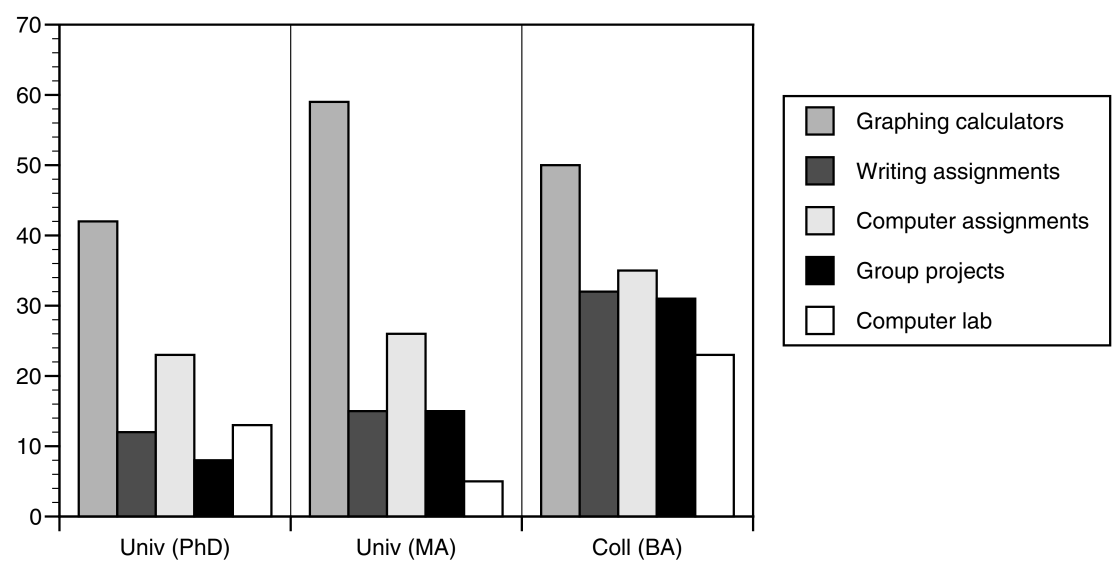

FIGURE FY.2.2 Percentage of enrollment in Mainstream Calculus II taught using various reform methods in Mathematics Departments by type of school: Fall 2000.

TABLES FY.3 AND FY.4: NON-MAINSTREAM CALCULUS COURSES

These tables are an elaboration of Tables SFY.20 and SFY.21 of Chapter 1. Table FY.3 studies the question "Who teaches non-mainstream Calculus I and II?" and Table FY.4 studies the use of reform pedagogies in non-mainstream Calculus I. (Recall that a calculus course is "non-mainstream" if it does not lead to upper division mathematical science courses.)

A. Enrollments

Enrollments in non-mainstream Calculus I rose from 97,000 in fall 1995 to 105,000 in fall 2000, an increase of about 8%. Average section sizes in doctoral and masters departments increased slightly, and decreased slightly in bachelors level departments. Enrollment in non-mainstream Calculus II decreased slightly from fall 1995 to fall 2000, and average section sizes in that second course rose in doctoral and bachelors level departments.

B. Staffing

As was the case with mainstream Calculus I, the period from 1995 to 2000 saw a decrease in the percentage of non-mainstream Calculus I students taught by tenured and tenure-eligible faculty. In each type of department, the decline was about 12 percentage points. If one combines the percentages of enrollment taught by tenured, tenure-eligible, and other full-time faculty, one sees a small decrease—about three points—in the percentage of students taught by full-time faculty of all types in non-mainstream Calculus I in departments with graduate programs, and an increase of about five points in bachelors-only departments. There was an increase in the percentage of students taught by part-time faculty in doctoral departments, and a decline in other departments. Between 1995 and 2000, there was a decrease in the percentage of non-mainstream Calculus I students taught by graduate teaching assistants: in 1995, doctoral departments taught 30% of these students using graduate teaching assistants, and in 2000 the percentage was 22%. In masters level departments, the percentage of non-mainstream Calculus I enrollments taught by graduate students declined from 5% in 1995 to less than one half of one percent in fall 2000.

C. Use of Reform Pedagogies

Table FY.4 shows that the use of graphing calculators in non-mainstream Calculus I increased between 1995 and 2000 in all types of departments and by fall 2000 was comparable to the use of graphing calculators in mainstream Calculus I. Unlike the situation in mainstream Calculus I, it was the masters level departments that seemed to be taking the lead in using reform pedagogies in non-mainstream Calculus I, although the fall 2000 percentages of enrollment taught using some of the new methods (e.g., weekly computer lab format) were low in every type of department.

The use in fall 2000 of other reform pedagogies for which 1995 data is available increased in doctoral and masters departments, and decreased in bachelors level departments. Comparison with Table FY.4 shows that the use of writing assignments, required computer assignments, and group projects was considerably lower in non-mainstream Calculus I than in mainstream Calculus I courses. It is safe to say that by fall 2000, calculus reform had produced greater changes in mainstream calculus than in non-mainstream sections.

TABLE FY.3 Percentage of enrollment in Non-Mainstream Calculus I and II taught by tenured/tenure-eligible, other full-time, part-time faculty, graduate teaching assistants, and unknown instructors in Mathematics Departments by size of sections and type of school: Fall 2000. Also total enrollments (in 1000s) and average section size.

	Percentage of enrollment taught by																				
	Tenured/ tenure- eligible %			Other full-time %			Part-time %			Graduate teaching assistants %			Unknown %			Enrollment in 1000s			Average section size		
Course	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	59	86	22	17	0	0	9	14	22	15	0	0	0	0	56	19	2	1	93	55	29
Reg. section <36	14	44	60	16	22	18	22	25	21	45	1	0	3	8	1	14	18	12	30	29	22
Reg. section >35	42	29	52	24	34	33	20	22	10	13	0	0	1	15	5	23	12	4	77	41	38
Total Non-Mnstrm Calculus I	**41**	**41**	**56**	**19**	**25**	**21**	**17**	**23**	**18**	**22**	**0**	**0**	**1**	**11**	**5**	**56**	**32**	**17**	**58**	**34**	**25**
Total Non-Mnstrm Calculus II	43	82	100	11	0	0	26	14	0	20	0	0	0	4	0	8	2	0.5	50	24	26
Total Non-Mnstrm Calculus I & II	**41**	**44**	**58**	**18**	**24**	**20**	**18**	**23**	**17**	**21**	**0**	**0**	**2**	**9**	**5**	**64**	**34**	**17**	**57**	**33**	**25**
1995 data	50	53	67	10	16	4	8	26	30	32	5	0	0	0	0	60	29	22	52	32	25

Note: 0 means less than one half of 1% in columns 1 through 5 and less than 500 enrollment in column 6.

TABLE FY.4 Percentage of enrollment in Non-mainstream Calculus I taught using various reform methods in Mathematics Departments by type of section and type of school: Fall 2000, plus historical data. Also total enrollments (in 1000s) and average section size.

	Percentage of Mainstream Calculus I enrollment taught using																				
	Graphing calculators %			Writing assignments %			Computer assignments %			Group projects %			Weekly computer lab %			Enrollment in 1000s			Average section size		
	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	19	100	0	7	50	0	2	47	0	0	50	0	2	0	0	19	2	1	92	55	29
Regular section <36	19	73	61	1	22	10	1	16	8	0	4	5	0	13	3	14	18	12	30	29	22
Regular section >35	39	50	81	22	9	15	22	29	0	22	4	20	0	0	0	23	12	4	77	41	38
Total Non-mainstream Calculus I	**27**	**66**	**63**	**12**	**19**	**11**	**10**	**23**	**5**	**9**	**8**	**8**	**1**	**7**	**2**	**56**	**33**	**17**	**58**	**34**	**25**
1995 data	25	20	34	6	4	14	3	7	11	5	3	15	na	na	na	50	27	20	54	33	26

Note: 0 means less than one half of 1% in columns 1 through 5, and less than 500 enrollments in column 6.

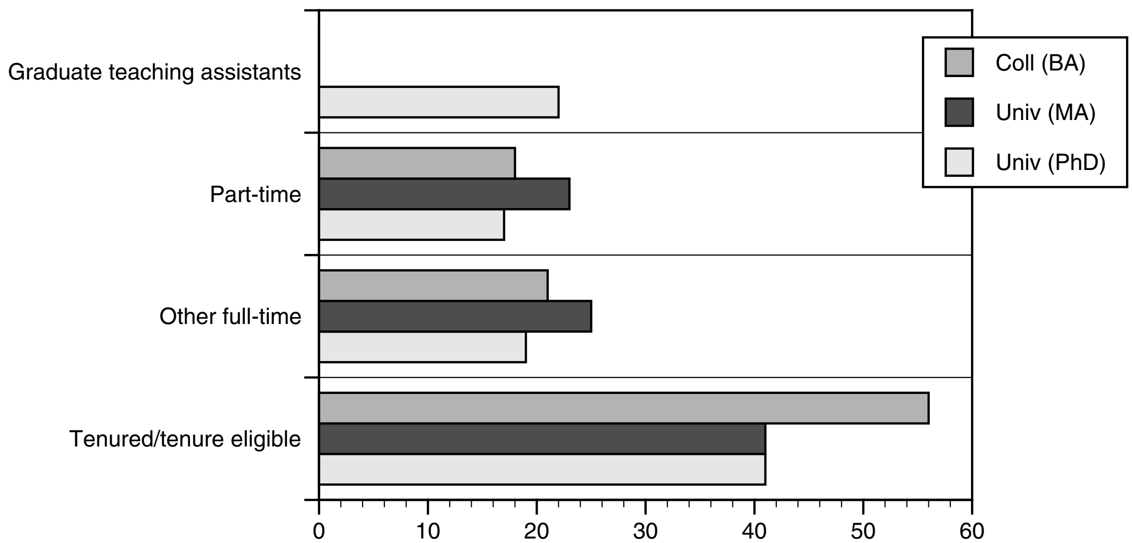

FIGURE FY.3.1 Percentage of enrollment in Non-mainstream Calculus I in Mathematics Departments taught by various types of instructor and type of school: Fall 2000.

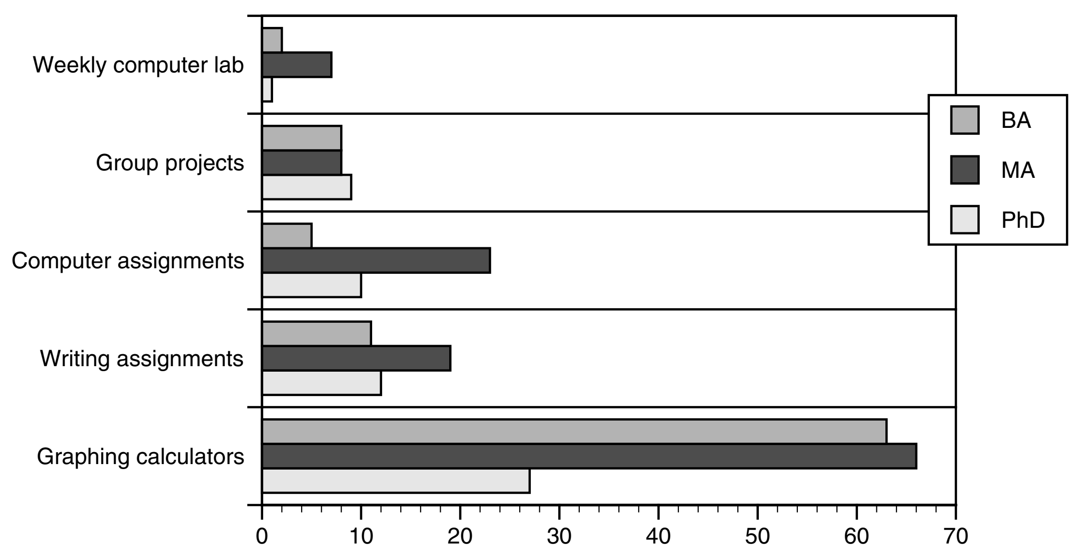

FIGURE FY.4.1 Percentage of enrollment in Non-mainstream Calculus I taught using various reform methods in Mathematics Departments by type of school: Fall 2000.

TABLES FY.5, FY.6, FY.7, AND FY.8: FIRST-YEAR STATISTICS COURSES

These tables are an elaboration of Tables SFY.22 and SFY.23 of Chapter 1. Tables FY.5 and FY.6 present data on a pair of first-year elementary level statistics courses (i.e., having no calculus prerequisite) that are offered in mathematics departments, while Tables FY.7 and FY.8 present data on the same courses, plus three others, that are offered in statistics departments. Tables FY.5 and FY.7 study the question "Who taught elementary level statistics courses?" while Tables FY.6 and FY.8 present data on how the courses were taught.

There is an unfortunate but unavoidable confusion in the terminology used in these tables. The category "elementary level statistics" includes all statistics courses that do not have a calculus prerequisite. In

TABLE FY.5 Percentage of enrollment in Elementary Statistics (non-Calculus) and Probability and Statistics (non-Calculus) taught by tenured/tenure-eligible, other full-time, part-time faculty, graduate teaching assistants, and unknown instructors, in Mathematics Departments by size of sections and type of school: Fall 2000, with historical data. Also total enrollments (in 1000s) and average section size.

	Percentage of enrollment taught by																				
	Tenured/ tenure-eligible %			Other full- time %			Part-time %			Graduate teaching assistants %			Unknown %			Enrollment in 1000s			Average section size		
Mathematics Departments	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Elementary Statistics (non-Calculus)																					
Lecture/ recitation	38	68	45	3	28	5	25	4	15	30	0	0	4	0	35	12	5	8	54	45	29
Regular section <36	41	58	41	24	10	17	11	19	36	24	3	0	0	10	6	4	20	39	26	29	26
Regular section >35	39	43	40	13	12	35	23	4	25	20	0	0	5	41	0	13	6	7	53	47	40
Total Elementary Statistics	**39**	**57**	**42**	**9**	**9**	**17**	**22**	**14**	**31**	**24**	**2**	**0**	**6**	**18**	**10**	**29**	**31**	**54**	**54**	**45**	**29**
1995 data	29	69	73	10	11	5	16	15	22	46	6	0				17	29	51	45	35	30
Probability & Statistics (non-Calculus)																					
Total Probability & Statistics	**63**	**18**	**55**	**28**	**69**	**15**	**9**	**12**	**30**	**0**	**1**	**0**	**0**	**0**	**0**	**3**	**2**	**8**	**35**	**30**	**22**
1995 data	36	75	69	1	12	0	12	10	31	51	3	0				6	6	6	34	31	27
Total both courses	**41**	**54**	**43**	**11**	**13**	**17**	**21**	**14**	**31**	**22**	**2**	**0**	**5**	**17**	**9**	**32**	**33**	**62**	**45**	**33**	**27**

Note: 0 means less than one half of 1% in columns 1 through 5, and less than 500 enrollment in column 6.

the questionnaire sent to mathematics departments, three courses were studied within that category: Elementary Statistics, Probability and Statistics, and "Other elementary level statistics courses." Tables FY.5 and FY.6 study the first and second courses in the list, namely the Elementary Statistics course and the Probability and Statistics course. As a result, the enrollment figures given in FY.5 for the single Elementary Statistics course do not match the total enrollment figures given in Table E.2 of Chapter 3 for all elementary level statistics courses.

The questionnaire sent to statistics departments included a wider array of courses in the elementary statistics level, namely Elementary Statistics, Probability and Statistics, Statistical Literacy, Statistics for Pre-service Elementary School Teachers, Statistics for Pre-service High-School Teachers, and "Other elementary level statistics courses." The courses studied in Tables FY.7 and FY.8 are the first four of those courses and consequently the enrollment figures given in FY.7 and FY.8 do not match the category total given for all elementary level statistics courses taught in statistics departments that appears in Table E.2 of Chapter 3.

In fall 2000, the Elementary Statistics course accounted for the vast majority of all elementary level statistics enrollments shown in Table E.2 of Chapter 3—about five sixths in mathematics departments, and about three quarters in statistics departments. Consequently we focus most of the rest of this discussion on that one course.

A. Staffing the Elementary Statistics Course

Table FY.5 focuses on who teaches two elementary level statistics courses in mathematics departments, namely Elementary Statistics, and Probability and Statistics. As was the case with calculus courses, the period between fall 1995 and fall 2000 saw a decrease in the percentage of enrollment taught by tenured and tenure-eligible faculty in masters and bachelors mathematics departments. During the same period, the percentage of students in the Elementary Statistics course who were taught by tenured and tenure-eligible faculty in doctoral mathematics departments rose. If one combines the percentages of students taught by all types of full-time faculty, one sees an almost ten point increase in doctoral mathematics departments and double digit decreases in masters and bachelors departments between fall 1995 and fall 2000. Because three quarters of all elementary statistics enrollments in mathematics departments were in bachelors and masters level departments, it is safe to say that there was an overall shift away from the use of full-time faculty to teach these courses. The use of part-time faculty to teach the Elementary Statistics course rose in doctoral and bachelors departments and declined slightly in masters level departments. The percentage of elementary statistics enrollments taught by graduate teaching assistants in mathematics departments dropped markedly between fall 1995 and fall 2000.

Table FY.7 presents data on who teaches the Elementary Statistics course in statistics departments. In doctoral statistics departments, there was a decline in the percentage of enrollments in Elementary

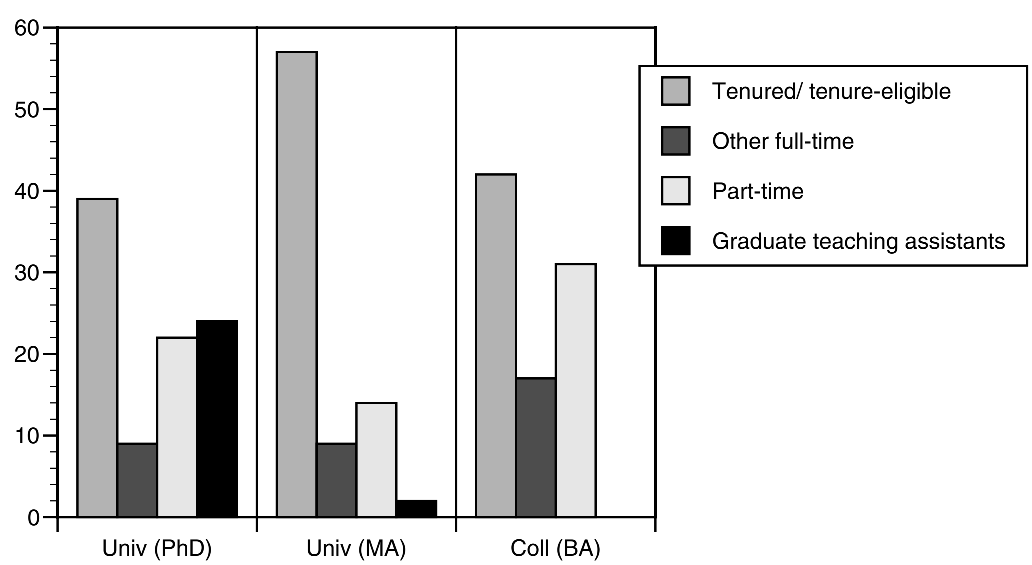

FIGURE FY.5.1 Percentage of enrollment in Elementary Statistics (non-Calculus) in Mathematics Departments by type of instructor and type of school: Fall 2000.

Statistics (no calculus prerequisite) taught by tenured and tenure-eligible faculty from 46% in fall 1995 to 34% in fall 2000. If one combines the percentages of enrollments taught by tenured, tenure-eligible, and other full-time faculty, one sees a decrease from 60% in 1995 to 51% in fall 2000. At the same time, there was a substantial increase in the percentage of enrollment taught by part-time faculty, coupled with a marked decrease in the percentage taught by graduate students.

TABLE FY.6 Percentage of enrollment in Elementary Statistics (non-Calculus) and Probability & Statistics (non-Calculus) taught using various reform methods in Mathematics Departments by type of section and type of school: Fall 2000, plus historical data. Also total enrollments (in 1000s) and average section size.

	Percentage of Statistics & Probability (non-Calculus) enrollment taught using																				
	Graphing calculators %			Writing assignments %			Computer assignments %			Group projects %			Weekly computer lab %			Enrollment in 1000s			Average section size		
Mathematics Departments	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA	PhD	MA	BA
Elementary Statistics (non-Calculus)																					
Lecture/recitation	46	40	31	33	67	56	76	60	38	30	33	20	50	32	38	12	5	8	54	45	29
Regular section <36	32	50	49	28	27	52	50	65	48	5	6	37	19	22	19	4	20	39	26	29	26
Regular section >35	34	55	81	10	23	43	23	15	29	2	13	23	0	11	37	13	6	7	53	47	40
Total Elementary Statistics	**38**	**49**	**51**	**22**	**33**	**52**	**48**	**55**	**44**	**14**	**12**	**32**	**23**	**22**	**24**	**29**	**31**	**54**	**54**	**45**	**29**
1995 data	na	na	na	na	na	na	42	30	64	na	na	na	na	na	na	17	29	51	45	35	30
Probability & Statistics (non-Calculus)																					
Total Probability & Statistics	0	10	55	14	88	40	0	88	43	14	10	20	14	5	13	3	2	8	35	30	22
1995 data	na	na	na	na	na	na	31	53	34	na	na	na	na	na	na	6	6	6	34	31	27
Total both courses	**35**	**46**	**51**	**21**	**37**	**50**	**44**	**57**	**44**	**14**	**12**	**31**	**22**	**21**	**23**	**32**	**33**	**62**	**45**	**33**	**27**

Note: 0 means less than one half of 1% in columns 1 through 5, and less than 500 enrollment in column 6.

B. Pedagogical Changes in the Elementary Statistics Course

Table FY.6 investigates the extent to which pedagogical methods promoted by the calculus reform movement had been adopted in the teaching of elementary level statistics in mathematics departments by fall 2000, and Table FY.8 presents data on the same issue in statistics departments. The only comparisons with 1995 data that are available concern the use of required computer assignments. Between fall 1995 and fall 2000, the use of computer assignments in elementary statistics courses increased in doctoral and masters mathematics departments and decreased substantially in bachelors departments. In doctoral statistics departments, the use of computer assignments in the Elementary Statistics course did not change between fall 1995 and fall 2000, remaining at 61%, a figure that is somewhat higher than the corresponding figure in the same courses in mathematics departments.

Tables FY.2 and FY.6 allow us to compare the percentage of enrollments taught using reform pedagogies (graphing calculators, writing assignments, etc.) in mainstream Calculus I and in the Elementary Statistics course as taught in mathematics departments. In fall 2000, graphing calculator use was lower in Elementary Statistics than in mainstream Calculus I and the use of group projects was about the same in the two courses. The percentages of enrollments in elementary statistics that used writing assignments, computer assignments, and weekly computer labs exceeded the corresponding percentages in mainstream Calculus I.

Tables FY.6 and FY.8 allow us to compare the use of reform pedagogies in the Elementary Statistics course as taught in mathematics departments and in statistics departments. In fall 2000, a smaller percentage of Elementary Statistics students in statistics departments used graphing calculators than in the same course taught in mathematics departments. In the use of writing assignments and group projects, mathematics doctoral departments and statistics doctoral departments were roughly comparable, while in the use of required computer assignments and weekly computer labs, doctoral statistics departments were substantially ahead of doctoral mathematics departments.

C. Enrollments and Section Sizes for the Elementary Statistics Course

The total combined enrollment for the Elementary Statistics course considered in Tables FY.6 and FY.8 grew from 132,000 in fall 1995 to 154,000 in fall 2000, an increase of almost 17%. (Note that this figure is not the same as the total appearing in Table E.2 for all elementary level statistics courses.) In mathematics departments, enrollment in the Elementary Statistics course rose by almost 18% overall and increased in every type of department, with doctoral departments seeing the largest increases. Overall enrollment in the Elementary Statistics course taught in statistics departments increased by about 14%. As was the case in 1995, about three quarters of all enrollments in the Elementary Statistics course were in mathematics departments.

Between fall 1995 and fall 2000, average section sizes in the Elementary Statistics course rose by about

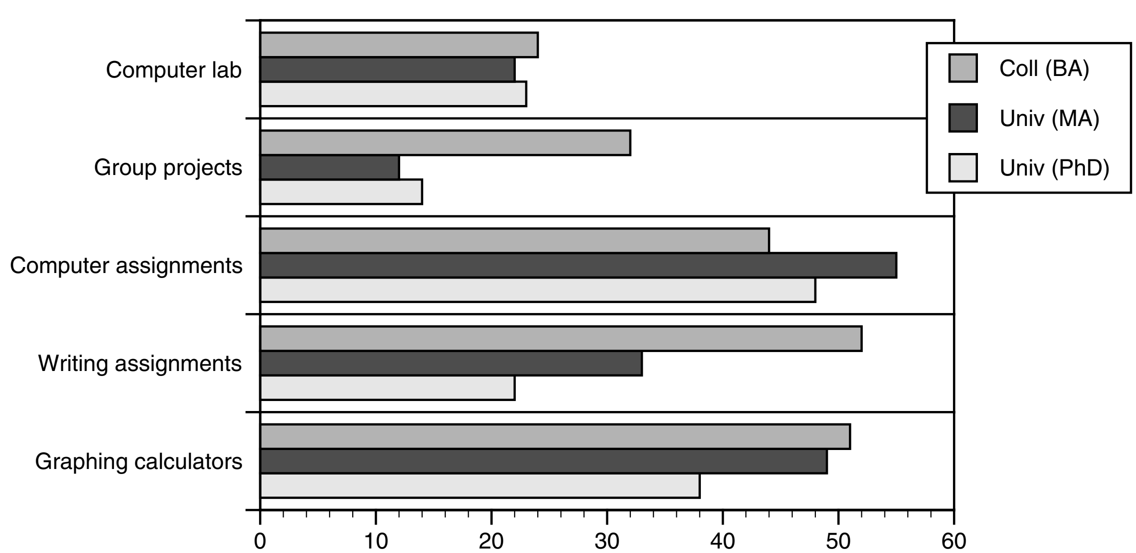

FIGURE FY.6.1 Percentage of enrollment in Elementary Statistics (non-Calculus) taught using various reform methods in Mathematics Departments by type of school: Fall 2000.

20% in doctoral mathematics departments (from 45 students per section to 54) and there was an even larger rise in masters level mathematics departments. Average section size in bachelors mathematics departments dropped slightly. Average section size in the Elementary Statistics course in doctoral statistics departments also rose, and remained higher than in doctoral mathematics departments (57 students per section, compared to 54).

TABLE FY.7 Percentage of enrollment in Elementary Statistics (non-Calculus) and Probability and Statistics (non-Calculus) taught by tenured/tenure-eligible, other full-time, part-time faculty, graduate teaching assistants, and unknown, in Statistics Departments by size of sections and type of school: Fall 2000, with historical data. Also total enrollments (in 1000s) and average section size.

	Percentage of enrollment taught by													
	Tenured/ tenure-eligible %		Other full-time %		Part-time %		Graduate teaching assistants %		Unknown %		Enrollment in 1000s		Average section size	
Statistics Departments	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA
Elementary Statistics (non-Calculus)														
Lecture/recitation	36	51	19	21	26	7	16	5	3	16	27	4	63	79
Regular section <36	34	89	8	0	8	11	43	0	7	0	1	0.4	26	33
Regular section >35	23	25	7	50	16	25	38	0	16	0	7	0.3	48	45
Total Elementary Statistics, 2000	**34**	**53**	**17**	**21**	**24**	**8**	**21**	**4**	**4**	**14**	**35**	**5**	**63**	**79**
1995 data	46	50	14	25	9	25	31	0			33	2	52	45
Probability & Statistics (non-Calculus)														
Total Probability & Statistics	**15**	**18**	**7**	**25**	**19**	**0**	**39**	**17**	**20**	**40**	**3**	**1**	**51**	**68**
1995 data	19	86	2	14	4	0	75	0			7	1	52	30
Statistics literacy	13	68	30	17	2	15	53	0	2	0	4	0.5	79	33
Statistics for pre-service teachers	100	0	0	63	0	0	0	0	0	37	0.04	0.08	39	54
All courses in Table FY.7	**31**	**48**	**17**	**22**	**21**	**7**	**25**	**6**	**6**	**17**	**42**	**6**	**58**	**61**

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

TABLE FY.8 Percentage of enrollment in Elementary Statistics (non-Calculus) and Probability & Statistics (non-Calculus) taught using various reform methods in Statistics Departments by type of section and type of school: Fall 2000, plus historical data. Also total enrollments (in 1000s) and average section size.

	Percentage of Statistics & Probability (non-Calculus) enrollment taught using													
	Graphing calculators %		Writing assignments %		Computer assignments %		Group projects %		Weekly computer lab %		Enrollment in 1000s		Average section size	
Statistics Departments	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA
Elementary Statistics (non-Calculus)														
Lecture/recitation	16	0	25	3	58	85	16	19	40	100	27	4	63	79
Regular section <36	1	0	10	56	35	100	10	23	23	10	1	0.4	26	33
Regular section >35	12	0	26	50	74	50	17	0	33	0	7	0.3	48	45
Total Elementary Statistics	**15**	**0**	**25**	**11**	**61**	**85**	**16**	**18**	**38**	**85**	**35**	**5**	**57**	**67**
1995 data	na	na	na	na	61	25	na	na	na	na	33	2	52	45
Probability & Statistics (non-Calculus)														
Total Probability & Statistics	5	0	46	0	52	0	12	0	10	0	3	1	51	68
1995 data	na	na	na	na	60	39	na	na	na	na	7	1	52	30
Statistics literacy	28	23	15	77	32	60	15	69	28	31	4	0.5	79	33
Statistics for pre-service teachers	0	0	0	63	0	63	0	63	0	63	0.04	0.08	39	54
All courses in Table FY.8	**15**	**2**	**25**	**15**	**58**	**65**	**15**	**20**	**35**	**64**	**42**	**6**	**58**	**61**

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

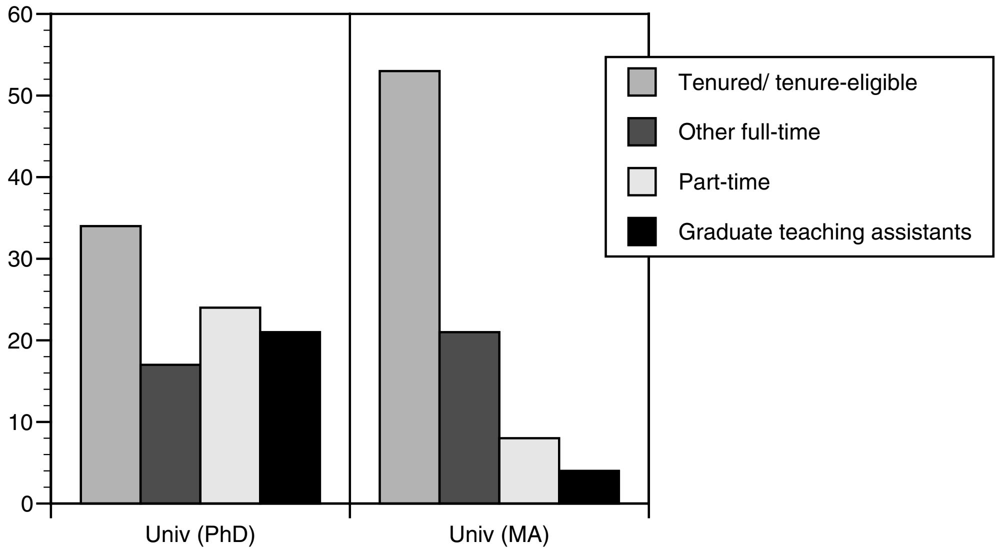

FIGURE FY.7.1 Percentage of enrollment in Elementary Statistics (non-Calculus) in Statistics Departments by type of instructor and type of school: Fall 2000.

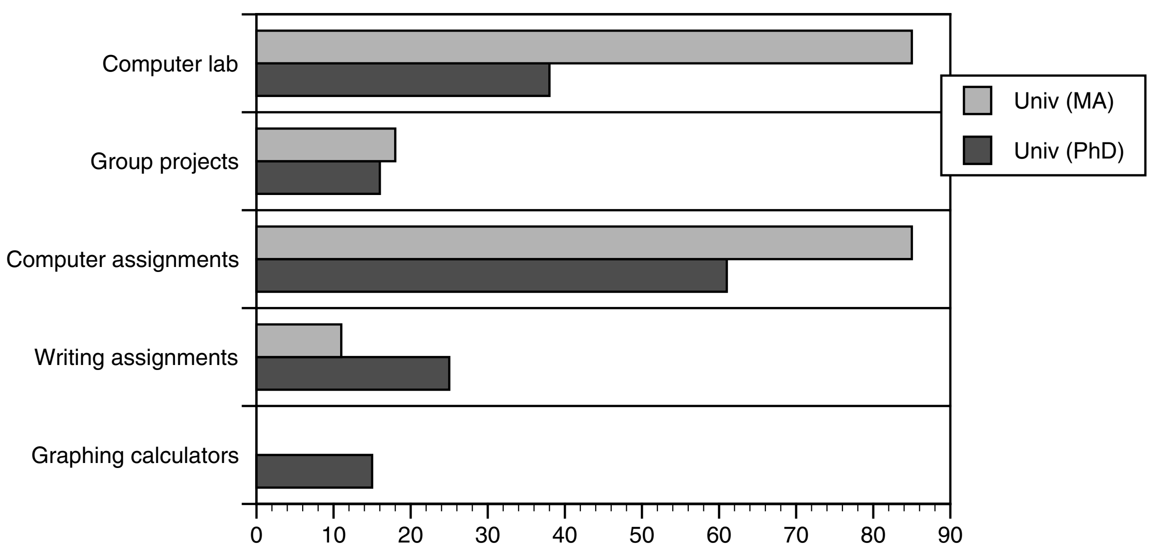

FIGURE FY.8.1 Percentage of enrollment in Elementary Statistics (non-Calculus) taught using various reform methods in Statistics Departments by type of school: Fall 2000.

Chapter 6

Two-Year College Mathematics Programs Enrollment, Course Offerings, and Instructional Practices

This chapter reports estimated enrollment and instructional practices in courses offered in fall 2000 in the approximately 1053 two-year college mathematics programs in the United States. Also included in this chapter are total enrollment in two-year colleges, average class size, trends in availability of mathematics courses, enrollment in mathematics courses offered outside of mathematics programs, and services available to mathematics students. The data are compared with the results of the 1965, 1970, 1975, 1980, 1985, 1990, and 1995 CBMS surveys. Further analysis of many of the items discussed in this chapter can be found in Chapter 1 of the current report where they are discussed from a comprehensive point of view in comparison to similar data for four-year colleges and universities.

Unlike the 1990 and earlier CBMS surveys, computer science courses taught *outside* the mathematics program, and the faculty who taught them, were *not* considered part of the "mathematics program" in the 1995 survey or in this 2000 survey. In the current report, no computer science courses taught, for example, by a separate computer science department are included as mathematics program enrollment. The 1995 CBMS survey also did not include such computer science courses, except for their inclusion in the "Other" category in the 1995 version of Tables TYR.15 and TYR.16. In the current report, computing courses taught *within* the mathematics program are appropriately labeled in Tables TYR.3 and 4. They are *not* included in Table TYR.2 which reports only *mathematics* (including statistics) course enrollment within mathematics programs for all years and hence allows historical comparison.

The numbers given for two-year colleges in the current report were projected from a stratified random sample of 300 non-profit two-year colleges with mathematics programs. Survey forms were returned by 179 colleges (60% of the sample). Of these, 94% were public colleges and 6% were private. In 1995 there was a 65% return (163 colleges) on a sample base of 250 schools, 96% being public and 4% private. The 2000 sample size was 25% larger than that for four-year institutions because of the greater variability among two-year schools. For more information on the sampling procedure used in this survey, see Appendix II. A copy of the two-year college questionnaire may be found in Appendix V.

Highlights

- Although the number of students enrolled in two-year colleges rose about 2% between 1994 and 1998 (the latest year at the time of this writing for which firm data is available from NCES, the National Center for Education Statistics), enrollment in mathematics and statistics courses taught in two-year college mathematics programs dropped from 1995 to 2000 by about 7.5%. See Tables TYR.1 and TYR.2.
- Two-year and four-year schools ended the decade with mathematics enrollments at about what they were in 1990 but followed very different paths to this result. Four-year enrollments fell from 1990 to 1995 and rebounded in 2000 to their earlier levels. By contrast, two-year enrollments rose sharply from 1990 to 1995 but by 2000 had fallen back to 1990 levels. See Table SE.1 in Chapter 1.
- Enrollment in remedial classes accounted for over half (55%) of mathematics program enrollment in two-year colleges. See Table TYR.4.
- Remedial level courses, which lost 37,000 enrollments, accounted for the largest segment of the enrollment decline. This was an almost 5% remedial mathematics enrollment drop from 1995 to 2000. See Table TYR.4.
- The calculus segment, which includes both mainstream and non-mainstream calculus, had the largest *percentage* enrollment decrease (18%) from 1995 to 2000. This decline was about 23,000 students. Non-mainstream calculus was particularly hard hit with a 38% drop in enrollment in the first term course. (In this survey, "mainstream" refers to the calculus courses which lead on to more advanced mathematics courses such as Differential Equations, and are taken by, among others, engineering, physics, and science majors.) See Tables TYR.3 and TYR.4.
- Mathematics courses showing enrollment percentage increases from 1995 to 2000 were Elementary Statistics (3%), Mathematics for Liberal Arts (13%), and Mathematics for Elementary School

Teachers (12.5%). These were the only courses to show increases. See Table TYR.3.

- During the two-academic-year period of 1999–2000 and 2000–2001, 65% of all two-year colleges offered a pre-calculus/elementary functions course, a nearly twenty percentage point increase compared to the 1994–1995 and 1995–1996 period studied by CBMS1995. The percentage of two-year colleges offering a combined college algebra/trigonometry course during that same two-year period almost doubled to 32%. See Table TYR.5.
- About half of two-year colleges offered a special mathematics course for pre-service K–8 teachers in either academic year 1999–2000 or 2000–2001. Fewer than a quarter assigned a faculty member to coordinate pre-service K–8 teacher education. See Table PSE.3 in Chapter 2 and also the discussions in Chapter 2 and in Chapter 7 under Special Topics.
- In comparison to 1995, in fall 2000 an increasing percentage of two-year colleges, but still no more than 50%, offered specialized courses such as Linear Algebra, Mathematics for Liberal Arts, and Mathematics for Elementary School Teachers. See Table TYR.5.
- On average, almost 90% of mathematics class sections at two-year colleges met the size recommendations of the Mathematical Association of America, namely, that undergraduate mathematics classes should not exceed 30 students. The average section size in all mathematics courses was 23.7, an almost two student drop in comparison to the 1995 survey results. The average section size of individual courses did not vary much from that number. Only 10% of sections had an enrollment above 35. See Tables TYR.7 and TYR.8.
- In fall 2000, part-time faculty members, including those paid by third parties such as school districts, constituted about 69% of the total faculty and taught 46% of all class sections. The percentage of sections taught by part-time faculty rose by 8 percentage points from fall 1995 to fall 2000. The part-time faculty teaching percentage varied by type of course, with part-time faculty members teaching 58% of remedial courses and 15% of mainstream calculus courses. The first number rose by 11 percentage points between 1995 and 2000, and the second dropped by 2 percentage points. See Tables TYR.9 and TYR.17 and the 1995 CBMS survey report.
- The predominant instructional modality continued to be the standard lecture method. The graphing calculator was widely used in all courses beginning with College Algebra. Of mainstream Calculus I sections, at least 30% used either a writing component or group projects or both, a proportion that has grown steadily since 1990. See Tables TYR.10 and TYR.11.
- Virtually all two-year colleges with mathematics programs had diagnostic or placement testing. About 98% had a mathematics lab or tutorial center. See Table TYR.12.
- Enrollment in mathematics courses outside of the mathematics program (e.g., in a developmental studies department) continued to decline and at a rate faster than overall mathematics program enrollment (23% versus 7.5%). See Table TYR.15.

Enrollment, Class Size, and Course Offerings

Trends in the Number of Two-Year College Students

About 5,516,000 students were enrolled in two-year colleges in fall 1998. This was the most recent confirmed figure available from the National Center for Education Statistics (NCES) for use in the fall 2000 CBMS report. For enrollment projections beyond 1998, see Chapter 1 of the current report, Table SE.1. NCES data can be accessed as follows: Digest of Education Statistics 2000, Chapter 3: Post-Secondary Education, http://nces.ed.gov/pubs2001/2001034c.pdf.

According to NCES data, between 1990 and 1994 the number of students enrolled in two-year colleges in the United States had fallen about 8%. But by 1998 this total two-year college enrollment had rebounded 2%. See Table TYR.1.

Enrollment in two-year colleges in fall 1998 constituted about 38% of the total enrollment in post-secondary institutions, namely, 5,516,444 students in a total post-secondary enrollment of 14,549,189. The percentage is even higher, namely, 44%, when two-year college enrollment is compared to total post-secondary *undergraduate* enrollment (12,476,914) for 1998. The 38% figure was the same percentage reported for fall 1994 in the fall 1995 CBMS survey. The comparative analysis in Chapter 1 of the current report shows that in fall 1995 two-year colleges taught 41% of all undergraduate mathematics enrollments.

The numbers in the preceding paragraphs for total post-secondary enrollment or for total undergraduate enrollment are reported in Table 178 of the NCES web page, part of the Integrated Post-Secondary Education Data System (IPEDS). We also observe that, using 1997 data, IPEDS surveys found that, as in 1994, the vast majority of two-year college students (96%) were enrolled in public colleges rather than in private or for-profit colleges. See Table 177 in the NCES reference given above. In 1994 the figure for enrollment in public two-year colleges was 94%.

TABLE TYR.1 Total enrollment (all disciplines) and percentage of part-time enrollments in two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1994, and 1998.

	1970	1975	1980	1985	1990	1994	1998
Number of students	2,499,837	4,069,279	4,825,931	4,730,235	5,850,803	5,396,636	5,516,444
Percentage part-time	48	54	63	65	65	64	62

Sources: 1970-1990: Community, Junior, and Technical College Directory, 1972, 1976, 1981, 1986, and 1991, AACJC, One Dupont Circle, NW, Washington, DC 20036
Source 1994: American Association of Community Colleges, 1994 Fall Survey.
Source 1998: National Center for Educational Statistics IPEDS Fall enrollment Survey.

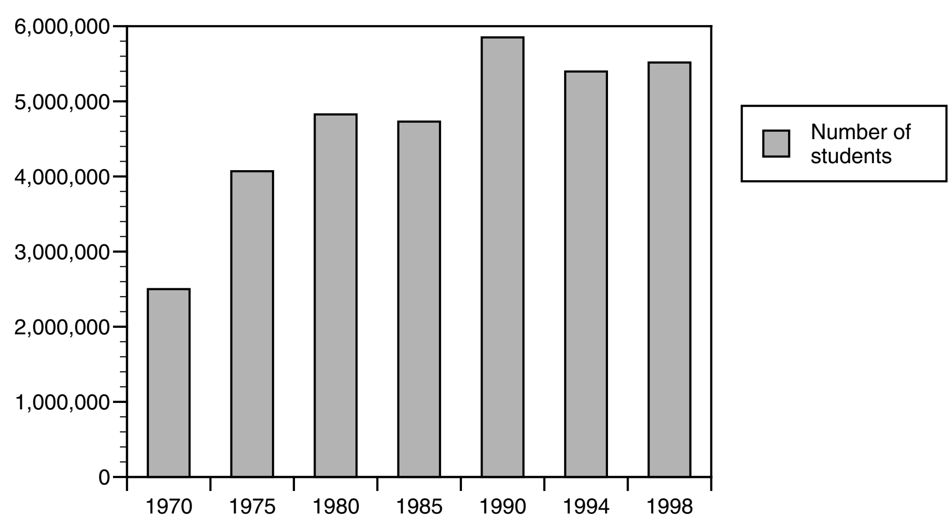

FIGURE TYR.1.1 Total enrollments (all disciplines) in two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1994, and 1998.

Trends in Enrollment in Two-Year College Mathematics Programs

While overall two-year college enrollment was rising from 1994 to 1998, Table TYR.2 shows enrollment in mathematics and statistics courses within mathematics programs declined by 7.5% in the five-year period from 1995 to 2000. As was the case in CBMS1995, Table TYR.2 does not include any computer science enrollments. Enrollment totals in Table TYR.2 reported from CBMS surveys before CBMS1995 have been adjusted to remove all computer science enrollments. For more detail on this reporting issue, see the second paragraph at the start of the current chapter.

In addition to what follows, 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 schools over the decade 1990 to 2000 and also contains enrollment comparisons between two-year and four-year schools. These comparisons include computer science enrollments reported within two-year college mathematics programs.

The interesting pattern which emerged over the decade 1990 to 2000 is that both two-year and four-year schools ended the decade with mathematics enrollment at about the same level each reported at the start of the decade. But they followed very different paths in reaching that point. Four-year enrollments fell from 1990 to 1995 and rebounded in 2000 to their earlier levels. By contrast, two-year enrollments rose sharply from 1990 to 1995 but by 2000 had fallen to 1990 levels.

TABLE TYR.2 Enrollments in Mathematics and Statistics (no Computer Science) courses in Mathematics Programs at two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

	1970	1975	1980	1985	1990	1995	2000
Mathematics & Statistics enrollments	571,000	864,000	953,000	936,000	1,295,000	1,456,000	1,346,724

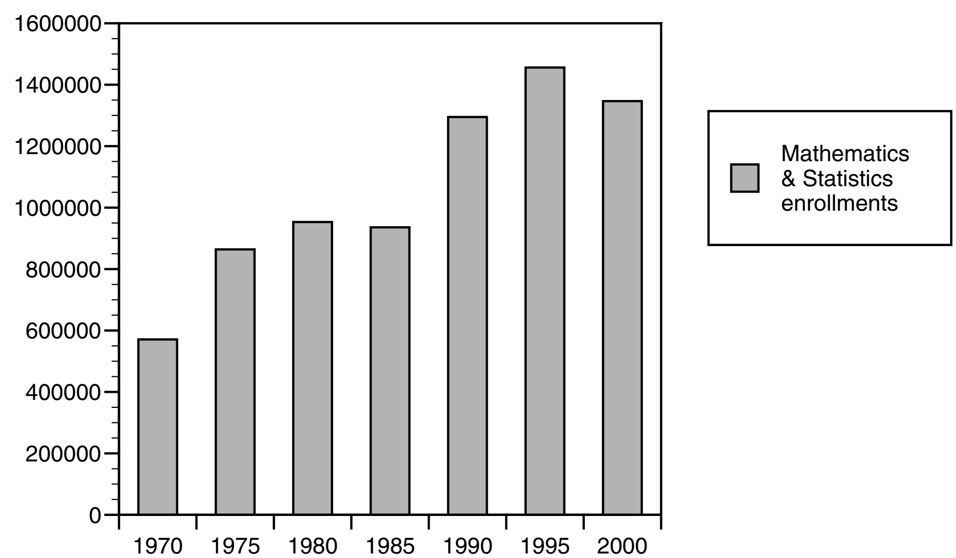

FIGURE TYR.2.1 Enrollments in Mathematics and Statistics courses (no Computer Science) in Mathematics Programs in two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

The 2000 survey confirmed that the typical two-year college mathematics program principally offered courses for remedial or general education and in support of disciplinary majors other than mathematics. This is consistent with past CBMS surveys which showed that few two-year college students intended to transfer to a four-year college or university and study mathematics as a major.

Trends in Enrollment in Specific Courses

Remediation comprised over half of mathematics program enrollment (55%) in fall 2000, with courses at the pre-calculus level accounting for another 20% of enrollment. However, in spite of a small overall enrollment increase at two-year colleges from 1994 to 1998, almost all major mathematics enrollment categories declined from 1995 to 2000, including remediation. See Table TYR.4. These declines, respectively by category, are remediation 5%; pre-calculus 7%; calculus 18%; and computing 9%. The category "other courses" declined 19%. Only statistics/probability showed a rise in enrollment from 1995 to 2000, namely, 3%.

Table TYR.3 reports enrollment in *individual* courses. Excepting two very low enrollment computer courses, only 3 of the 38 courses listed in CBMS2000 increased in enrollment from fall 1995 to fall 2000. During that period, enrollment in Elementary Statistics grew by about 3%, reaching 71,000 students in fall 2000. Mathematics for Elementary School Teachers grew by 12.5%, reflecting the increased involvement of two-year colleges in teacher education. Enrollment in Mathematics for Liberal Arts rose by about 13%, from 38,000 to 43,000.

Enrollments in the other 33 individual courses either were unchanged from 1995 levels or decreased markedly. The steepest enrollment declines occurred in Trigonometry (30%), Linear Algebra (40%), Business Mathematics (40%), and the first semester of non-mainstream calculus (38%).

Table TYR.4 reports enrollment for categories of courses. It is constructed from Table TYR.3 and reports head counts and percentages from 1970 through 2000 for the following course groupings: remedial, precalculus, calculus, statistics, computing, and an amalgam of other courses. Each category consists of five or more specific courses from Table TYR.3.

The reader should recall, as noted elsewhere, that mainstream calculus consists of those calculus courses which lead to more advanced mathematics courses and is usually required of majors in mathematics, the physical sciences, and engineering. Non-mainstream calculus includes the calculus courses most often taught to biology, behavioral science, and business majors. In addition, the reader should recall the two comments above about how computer science enrollments inside and outside of mathematics have been reported in Tables TYR. 2, 3, and 4.

TABLE TYR.3 Enrollment (in thousands) in Mathematics, Statistics, and Computer Science courses in Mathematics Programs at two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

Course number	Type of course	1970	1975	1980	1985	1990	1995	2000
	Remedial level							
1	Arithmetic & Basic mathematics	57	100	146	142	147	134	122
2	Pre-algebra	na	na	na	na	45	91	87
3	Elementary algebra (HS level)	65	132	161	181	262	304	292
4	Intermediate algebra (HS level)	60	105	122	151	261	263	255
5	Geometry (HS level)	9	9	12	8	9	7	7
	Precalculus level							
6	College algebra (above Intrmed alg)	52	73	87	90	153	186	173
7	Trigonometry	25	30	33	33	39	43	30
8	College algebra & trig (combined)	36	30	41	46	18	17	16
9	Intro to mathematical modeling	na	na	na	na	na	na	7
10	Precalc/ Elem fnctns/ Analyt geom	21	19	19	19	35	50	48
	Calculus level[1]							
11	Mainstream calculus I					53	58	53
12	Mainstream calculus II	58	62	73	80	23	23	20
13	Mainstream calculus III					14	14	11
14	Non-mainstream calculus I	na	8	9	13	31	26	16
15	Non-mainstream calculus II	na				3	1	1
16	Differential equations	1	3	4	4	4	6	5
	Other mathematics courses							
17	Linear algebra	1	2	1	3	3	5	3
18	Discrete mathematics	na	na	na	0	1	3	3
19	Elem statistics (with or w/o Probability)	11	23	20	29	47	69	71
20	Probability (with or w/o Statistics)	5	4	8	7	7	3	3
21	Finite mathematics	12	12	19	21	29	24	19
22	Mathematics for liberal arts	57	72	19	11	35	38	43
23	Math for elementary school teachers	25	12	8	9	9	16	18
24 & 25	Business mathematics	28	70	57	33	26	25	15
26	Technical math (non-calculus)	26	46	66	31	17	17	13
27	Technical math (calculus-based)	3	7	14	4	1	2	2
28	Other mathematics courses	--	--	--	--	--	--	14
	Computing[2]							
29	Computers and society	na	na	na	na	10	10	2
30	Introduction to software packages	na	na	na	na	na	21	16
31	Issues in Computer Science	na	na	na	na	na	0	1
32	Computer programming I	10	6	58	37	32	6	6
33	Computer programming II	na	na	na	5	8	1	2
34	Adv programming & data structures	na	na	na	6	3	1	1
35	Database management systems	na	na	na	na	4	1	1
36	Discrete mathematics for CS	na	na	na	na	na	na	0
37	Other Computer Science courses	---	--	--	--	--	--	10
38	Other Mathematics & CS courses	17	36	64	64	64	32	--
	Total all courses	**584**	**874**	**1048**	**1034**	**1393**	**1498**	**1386**

Note: 0 means fewer than 500 enrollments and na means not available.

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

[2] The computing enrollments for 1995 and 2000 include only those courses taught within Mathematics programs. For earlier years, they also include estimates of enrollment in Computer Science courses taught outside of Mathematics programs.

TABLE TYR.4 Enrollment (in 1000s) in Mathematics, Statistics, and Computer Science courses by type of course in Mathematics Programs at two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

Course number	Type of course	1970	1975	1980	1985	1990	1995	2000
1–5	Remedial	191 (33%)	346 (40%)	441 (42%)	482 (47%)	724 (52%)	800 (53%)	763 (55%)
6–10	Precalculus	134 (23%)	152 (17%)	180 (17%)	188 (18%)	245 (18%)	295 (20%)	274 (20%)
11–16	Calculus	59 (10%)	73 (8%)	86 (8%)	97 (9%)	128 (9%)	129 (9%)	106 (8%)
19–20	Statistics	16 (3%)	27 (3%)	28 (3%)	36 (3%)	54 (4%)	72 (5%)	74 (5%)
29–37	Computing[1]	13 (2%)	10 (1%)	95 (9%)	98 (10%)	98 (7%)	43[1] (3%)	39[1] (3%)
17,18, & 21–28	Other	171 (29%)	266 (31%)	218 (21%)	133 (13%)	144 (10%)	160 (11%)	130 (9%)
1–37	**Total all courses**	**584** **(100%)**	**874** **(100%)**	**1048** **(100%)**	**1034** **(100%)**	**1393** **(100%)**	**1498** **(100%)**	**1386** **(100%)**

Note: This table was constructed using Table TYR.3. Notice that the breakdown into type of course is different from that in Table SE.3 and Appendix I for four-year colleges and universities.

[1] The computing enrollment for 1995 and later includes only courses taught within Mathematics Programs. For earlier years it includes estimates of enrollments in Computer Science courses taught outside Mathematics Programs.

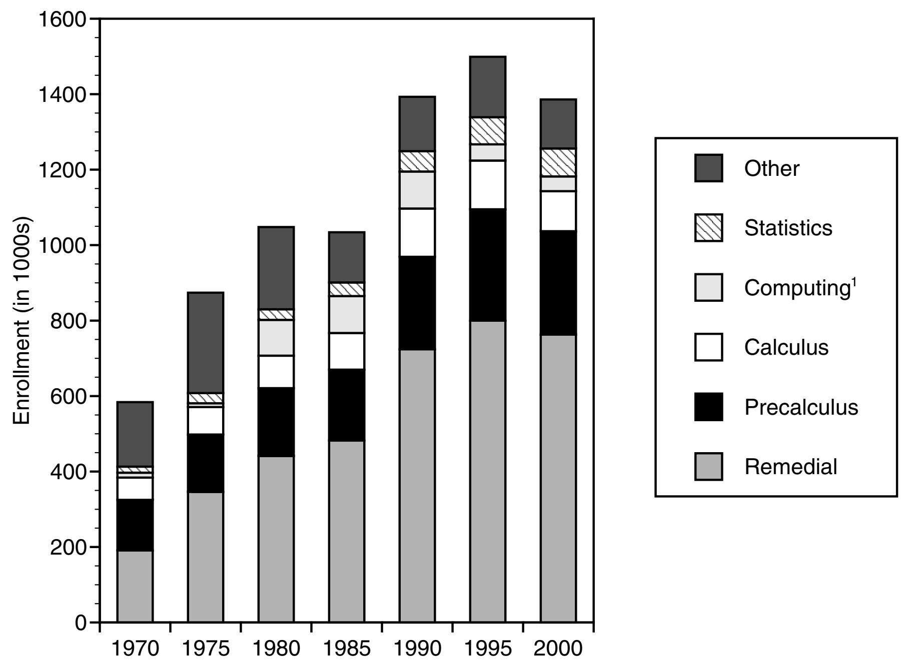

FIGURE TYR.4.1 Enrollment (in 1000s) in Mathematics, Statistics, and Computer Science courses by type of course in Mathematics Programs at two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

[1] The computing enrollment for 1995 and later includes only courses taught within Mathematics Programs. For earlier years it includes estimates of enrollments in Computer Science courses taught outside Mathematics Programs.

Trends in Availability of Mathematics Courses

As Table TYR.5 reports, every course at the remedial level except Intermediate Algebra was offered at a smaller percentage of schools in 2000 than in 1995. Largest among the drops was a 14 percentage point reduction in the percentage of mathematics programs offering a separate arithmetic skills course.

Historically, Intermediate Algebra is a course more likely to be found inside a mathematics program rather than supervised outside mathematics in a developmental studies department. Such was the case in 1995 for 84% of programs and in 2000 for 90%. This data suggests further solidification of Intermediate Algebra as the bridge course between remedial studies and the mathematics program where, in the presence of separate developmental studies units, the student moves to the mathematics program. Future surveys should investigate how many two-year college mathematics programs actually give associate degree graduation credit for Intermediate Algebra.

In comparison to 1995, the percentage of schools offering a separate college algebra course rose by 4 percentage points. However, the percentage of schools offering a separate trigonometry course dropped by 5 percentage points. By contrast, there was a 15 percentage point rise in offerings of combined college algebra/trigonometry courses and a 19 percentage point increase in offerings of pre-calculus/elementary functions. The first semester of mainstream calculus was offered by 94% of schools in 2000,

TABLE TYR.5 Percentage of the 1,053 two-year college Mathematics Programs teaching selected Mathematics courses at least once in either 1994–1995 or 1995–1996, and at least once in either 1999–2000 or 2000–2001.

Course number	Type of course	1995	2000
1	Arithmetic/Basic mathematics	70	56
2	Pre-algebra	46	41
3	Elementary algebra (HS level)	85	78
4	Intermediate algebra (HS level)	84	90
5	Geometry	17	14
6	College algebra	79	83
7	Trigonometry	71	66
8	College algebra & trigonometry	17	32
9	Introductory mathematical modeling	na	12
10	Precalculus/ Elementary functions/ Analytic geometry	46	65
11	Mainstream calculus I	83	94
12	Mainstream calculus II	79	88
13	Mainstream calculus III	65	67
14	Non-mainstream calculus I	52	40
15	Non-mainstream calculus II	10	6
16	Differential equations	53	59
17	Linear algebra	30	39
18	Discrete mathematics	12	19
19	Elementary statistics	80	83
20	Probability	5	4
21	Finite mathematics	31	32
22	Mathematics for liberal arts	46	50
23	Mathematics for elementary school teachers	43	49
24	Business mathematics (not transferrable[1])	28	14
25	Business mathematics (transferrable[2])	11	19
26	Technical mathematics (non-calculus)	33	36
27	Technical mathematics (calculus-based)	11	9

[1] Not transferable for credit toward bachelors degree.
[2] Transferable for credit toward bachelors degree.

compared to 83% in 1995. However, schools offering the first semester of non-mainstream calculus fell off by 12 percentage points in comparison to 1995.

One new course to which some college algebra enrollment might have migrated since 1995 is Introductory Mathematical Modeling. This course was included for the first time in a CBMS survey in fall 2000. It was offered that semester at 12% of two-year colleges. See Table TYR.5.

The CBMS1995 survey noted that many students at two-year colleges could not complete lower division mathematics requirements in certain majors because courses such as Linear Algebra, Mathematics for Liberal Arts, and Mathematics for Elementary School Teachers were offered at fewer than half of the two-year colleges with mathematics programs. Tables TYR.5 and TYR.6 display an important increase in the availability of these three baccalaureate-essential courses with 39%, 50%, and 49% of institutions offering them, respectively. In 1995, the comparable percentages were 30%, 46%, and 43%.

The increase in the availability of baccalaureate transfer courses may be a small sign of an overall better prepared two-year college mathematics student in fall 2000 when compared to 1995. At a minimum this data suggests a trend of more students passing through or using two-year college mathematics programs on their way to a baccalaureate degree and suggests two-year college mathematics programs are responding to this phenomenon. A separate national study of the number of two-year college students who move on to baccalaureate institutions and of what happens to them after they transfer to baccalaureate institutions, both in general and as regards mathematics, would be very informative.

Just 14% of two-year college mathematics programs offered a high-school-level geometry course in fall 2000, a 3 percentage point drop since 1995. This continues a steady decline, which began in 1980, in geometry enrollment at two-year colleges.

TABLE TYR.6 Percentage of the 1,053 two-year college Mathematics Programs teaching selected Mathematics courses: Fall 1970, 1985, 1990, 1995, and 2000.

Course number	Type of course	Percentage of two-year colleges teaching course 1970	1985	1990	1995	2000
11	Mainstream Calculus I	na	na	na	83	94
16	Differential equations	49	40	53	53	59
17	Linear algebra	17	24	34	30	39
18	Discrete Mathematics	na	3	21	12	19
19	Elementary Statistics	41	61	69	80	83
21	Finite Mathematics	19	27	46	31	32
22	Mathematics for liberal arts	na	25	35	46	50
23	Mathematics for elementary school teachers	48	31	32	43	49
26	Technical Mathematics (non-Calculus based)	41	42	36	33	36
27	Technical Mathematics (Calculus based)	19	18	6	11	9

Average Number of Students Per Section

In fall 2000, the average section size in two-year college mathematics courses continued the downward trend begun ten years earlier, ending the decade with an average section size of 23.7 students. The average section size in fall 2000 dropped from an average size of 25.5 reported in 1995. The average section size in 1990 was 27.8 students. The course levels that experienced the largest decrease in section sizes from 1995 to 2000 were computer science courses, which declined by an average of 4.1 students, precalculus level courses, which declined by an average of 3.2 students, and calculus level courses and elementary statistics courses, each of which declined by an average of 2.7 students. As Table TYR.7 shows, in fall 2000, on average, 9 out of 10 two-year college mathematics program classes met the class size recommendations of at most 30 students per section published by the Mathematical Association of America. [MAA Guidelines].

For a closer examination of individual course types, see Table TYR.8. It presents data on average section size for 37 different courses. In fall 2000, a section size of fewer than 20 students was reported in 30% of these courses while the majority of courses (57%) had between 20 and 25 students. Only 13% of the courses had more than 25 students per section. In CBMS2000 the courses with the largest average size (more than 25 students) were College Algebra & Trigonometry, Intermediate Algebra, College Algebra, Elementary Statistics, and Issues in Computer Science.

TABLE TYR.7 Average section size by type of course in Mathematics Programs at two-year colleges: Fall 1995 and 2000. Also percentage of sections with enrollment above 35: Fall 2000.

Course number[1]	Type of course	1995 average section size	2000 average section size	Percentage of 2000 sections with size > 35
1–5	Remedial	25.7	24.5	10.4
6–10	Precalculus	28.0	24.8	13.6
11–16	Calculus	23.5	20.8	9.0
19–20	Statistics	27.9	25.2	13.2
28–35	Computer Science	22.9	18.8	4.0
1–36	**Total all courses**	**25.5**	**23.7**	**10.3**

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

TABLE TYR.8 Average section size for two-year college Mathematics Program courses: Fall 2000.

Course number	Type of course	Average section size	Course number	Type of course	Average section size
1	Arithmetic & Basic mathematics	22.2	22	Mathematics for liberal arts	24.3
2	Pre-algebra	22.5	23	Math for elementary school teachers	20.9
3	Elementary algebra (HS level)	24.3	24	Business mathematics (not transferable)	19.7
4	Intermediate algebra (HS level)	26.1	25	Business mathematics (transferable)	22.1
5	Geometry (HS level)	21	26	Technical mathematics (non-calculus)	16.5
6	College algebra	25.5	27	Technical mathematics (calculus-based)	17.8
7	Trigonometry	23	28	Other mathematics courses	18.8
8	College algebra & trig. (combined)	26.7	29	Computers and society	20.6
9	Intro to mathematical modeling	20.2	30	Introduction to software packages	20.3
10	Precalculus[1]	23.5	31	Issues in Computer Science	30.6
11	Mainstream calculus I	22.5	32	Computer programming I	20.6
12	Mainstream calculus II	20.4	33	Computer programming II	18.1
13	Mainstream calculus III	15.3	34	Adv programming & data structures	21.4
14	Non-mainstream calculus I	21.6	35	Database management systems	12.9
15	Non-mainstream calculus II	20.3	36	Discrete mathematics for CS	15.1
16	Differential equations	16.1	37	Other Computer Science courses	15.7
17	Linear algebra	17.6			
18	Discrete mathematics	20.4			
19	Elementary statistics	25.2			
20	Probability	22.1			
21	Finite mathematics	22.8			

[1] Includes Precalculus, Elementary functions, Analytic geometry.

Courses Taught by Part-Time Faculty Members

In fall 2000, part-time faculty members made up about 69% of the total mathematics program faculty in two-year colleges, a 4 percentage point increase from 1995. They taught 46% of all sections offered, an 8 percentage point increase since 1995. This percentage varied by type of course. The courses most frequently taught by part-time faculty in fall 2000 were remedial level courses (58% of the sections). The use of part-time faculty for other course types is as follows: technical mathematics (43% of sections), computer science (39%), Elementary Statistics (34%), and Precalculus (33%). Only 15% of mainstream calculus sections were taught by part-time faculty.

Compared with the CBMS1995 report, the percentage of part-time faculty teaching remedial courses grew by 11 percentage points, while the percentage of part-time faculty teaching computer science courses and precalculus courses increased by 6 percentage points and 4 percentage points, respectively. In all other courses the increases were 3 percentage points or less. There were declines in the percentage of part-time faculty teaching mainstream calculus (2 percentage points) and advanced level mathematics courses (4 percentage points).

TABLE TYR.9 Number of sections and number and percentage of sections taught by part-time faculty in Mathematics Programs at two-year colleges by type of course: Fall 2000.

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
1–5	Remedial	29,891	17,413	58
6–10	Precalculus	10,822	3,562	33
11–13	Mainstream calculus	3,942	594	15
14–15	Non-mainstream calculus	784	198	25
16–18	Advanced level	625	76	12
19–20	Statistics	2,937	1,006	34
21–25	Service courses	3,905	1,523	39
26–27	Technical mathematics	816	349	43
28	Other mathematics	695	286	41
29–37	Computer science	2,077	801	39
1–37	**Total all courses**	**56,495**	**25,808**	**46**

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

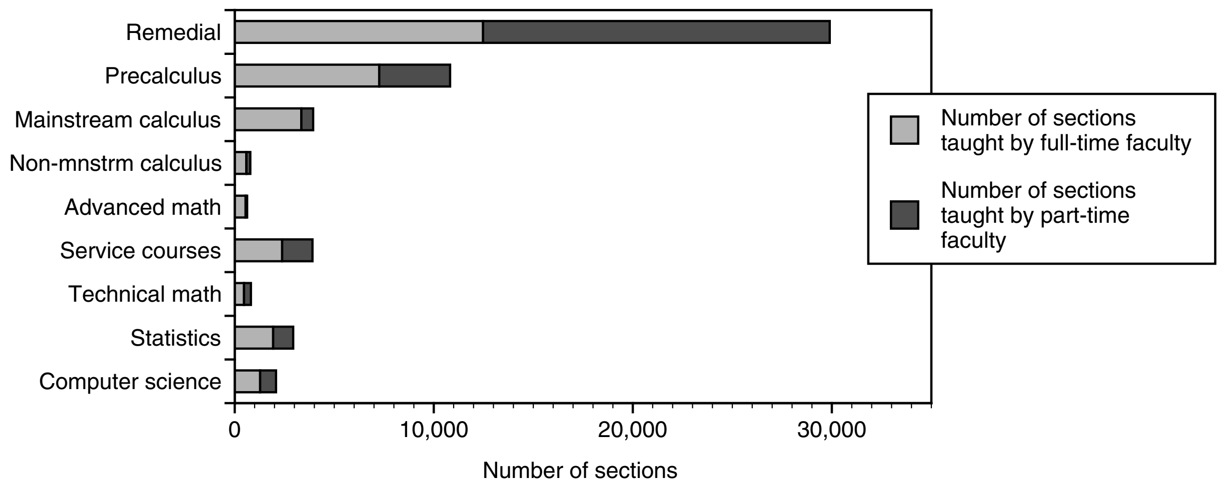

FIGURE TYR.9.1 Number of sections of Mathematics, Statistics, and Computer Science courses taught by full-time and part-time faculty in Mathematics Programs at two-year colleges by type of course: Fall 2000.

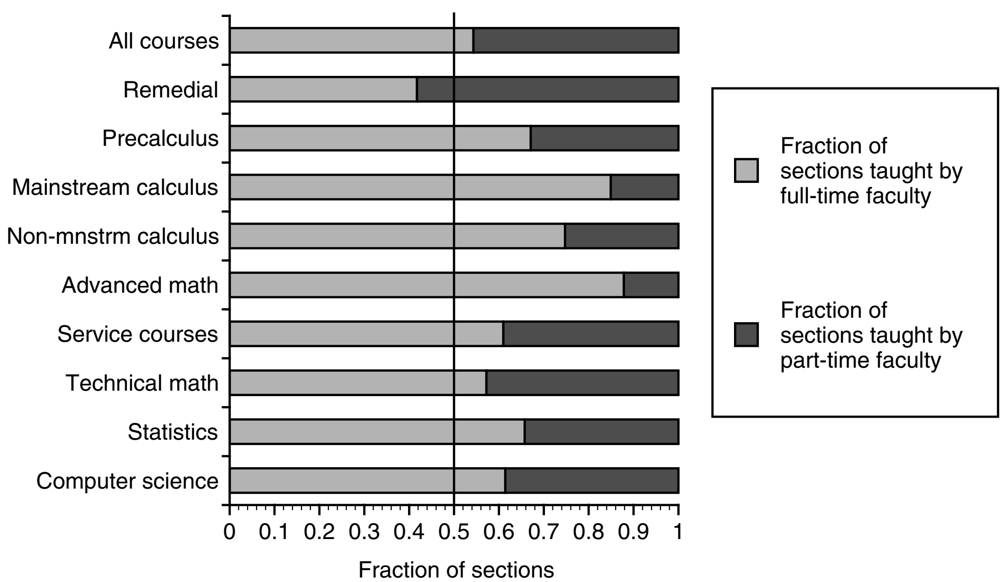

FIGURE TYR.9.2 Fraction of sections of Mathematics, Statistics, and Computer Science courses taught by full-time and part-time faculty in Mathematics Programs at two-year colleges by type of course: Fall 2000.

Instructional Practices

Table TYR.10 presents the percentage of sections that used various instructional practices in different courses. In fall 2000, the predominant instructional method was the standard lecture format, reported in use in 78% of all class sections. This percentage was nearly the same as that reported in the CBMS1995 (77%).

Calculus Courses and Reform Methods of Instruction

In fall 2000, there were clear patterns among various course types in terms of use of the five reform instructional methods included in the survey (use of a graphing calculator, inclusion of a writing component, the use of group projects, computer assignments, and weekly meetings in a computer lab setting). For all calculus courses (both mainstream and non-mainstream) and for precalculus courses as well, the graphing calculator was used more frequently than any other reform method. The percentage of sections using graphing calculators in calculus and pre-calculus courses ranged from 69% to 83%. Not surprisingly, mainstream Calculus I and mainstream Calculus II were taught in a very similar manner. The ordered ranking of the reform methods was the same for both courses, with mainstream Calculus I reporting a slightly greater use than mainstream Calculus II for 4 of the 5 methods. The exception was that mainstream Calculus II placed a slightly greater emphasis on computer assignments than did mainstream Calculus I.

Non-mainstream Calculus I reported a use of all reform methods that was substantially below that of mainstream Calculus I. Table TYR.10 also indicates that there was a greater use of reform methods in non-mainstream Calculus II than in non-mainstream Calculus I. In a somewhat surprising discovery, non-mainstream Calculus II had a higher percentage use of a writing component (39%) and weekly computer labs (19%) than any other calculus course (mainstream or non-mainstream). In interpreting this information, however, the reader needs to keep in mind that non-mainstream Calculus II enrollment in two-year colleges is very small in comparison to the other calculus courses.

Other Courses, Reform Methods, and Distance Learning

Among other mathematics courses, probability courses reported the highest use of computer assignments (59%) and weekly computer lab instruction (48%). With the exception of Computers & Society courses (90%), Introduction to Mathematical Modeling courses had the highest percentage of use of writing assignments (73%). This same course reported a greater emphasis on group projects (86%) than did any other mathematics course. Other courses that placed a high emphasis on the writing component included Elementary Statistics (50%), Mathematics for Elementary School Teachers (66%), and Introduction to Software (62%).

The 1995 CBMS survey inquired about courses taught using television. The 2000 survey modified this question to inquire about courses taught in some "distance learning" format. "Distance learning" was defined as a course structure in which at least half the students in the class received the majority of their instruction via a format in which the instructor was not physically present. Fewer than 1% of mathematics class sections were offered via television in 1995 and only 2.5% in 2000 were described as using distance learning. Among high enrollment courses, College Algebra had 6.7% of sections offered via distance learning and Elementary Statistics had 5.8%. Among low enrollment courses, the second semester of non-mainstream calculus had 19.4% of sections offered via distance learning, but the significance of this number is uncertain because of the small overall enrollment in this course, about 1000 students nationwide.

A comprehensive review, encompassing both two-year and four-year colleges, of fall 2000 data on distance learning instruction in mathematics can be found in Chapter 2 of the current report. The relevant survey questions as regards two-year colleges are in Appendix V.

Comparison of Use of Reform Methods in Calculus: Fall 1995 and Fall 2000

Table TYR.11 tracks the historical data on instructional patterns for two specific teaching techniques arising from the calculus reform movement that began in the mid-1980s. This table presents information on the use of group projects and the inclusion of a writing component in calculus courses. The percentage of sections reporting the use of group projects and writing components increased in all three levels of mainstream calculus, although the rate of increase was not as great as was seen earlier in the reform movement between 1990 and 1995. Among mainstream calculus courses, the largest increase in the use of group projects between 1995 and 2000 was in Calculus II which grew from 18% to 25% of all sections. Mainstream Calculus II also showed the greatest increase in the use of a writing component, increasing by 12 percentage points. Mainstream Calculus I reported an 11 percentage point increase. Among non-mainstream calculus courses, the percentage of sections reporting the use of group projects did not increase between 1995 and 2000. In non-mainstream Calculus I, there was no change in the use of group projects, while in non-mainstream Calculus II there was a decrease of 14 percentage points. The use of a writing component increased slightly in non-mainstream Calculus I (3 percentage points) and quite dramatically in non-mainstream Calculus II (23 percentage points). Once again, however, the reader must note that inferences from the data about non-mainstream Calculus II are affected by the extremely low enrollment reported nationwide in that course.

Other calculus instructional comparisons (1995 versus 2000) can be made by using Table TYR.10 of the current report and the same table in CBMS1995. Specific data is available on the use of graphing calculators, computer assignments, and weekly computer laboratories. For all three methodologies and in all three of mainstream Calculus I, II, and III, percentage of use increased over the five-year period, often sharply. The use of graphing calculators rose 13 percentage points, 11 percentage points, and 6 percentage points, respectively, in the three courses. Computer use rose 12, 21, and 9 percentage points, respectively. For Calculus I and II, there was a modest rise in the use of weekly computer laboratories, 2 and 4 percentage points, respectively. For Calculus III, laboratory use dropped by 3 percentage points. These facts may reflect the difficulty of scheduling regular computer laboratories for the typical community college student body, composed of large numbers of part-time, commuting, or non-residential students.

Comparison of Use of Reform Methods in Courses Other Than Calculus: Fall 1995 and Fall 2000

Comparing Table TYR.10 with the same table in CBMS1995 allows one to make some comments about changes in patterns of instruction in two-year college mathematics programs between 1995 and 2000 for large enrollment mathematics courses other than calculus. Increase in graphing calculator usage was especially dramatic for most courses while use of weekly computer laboratories increased only modestly.

Elementary Algebra experienced notable increases in use of all five methodologies: graphing calculators from 4% to 20%; writing components from 4% to 12%; computer assignments from 7% to 12%; group projects from 7% to 14%; and weekly meetings in a computer laboratory from 10% to 14%. The same 1995 to 2000 comparison for Intermediate Algebra, laid out in the same order, that is, the order of the first five columns of Table TYR.10, was as follows: 17% to 31%; 7% to 13%; 3% to 8%; 11% to 16%; and 7% to 8%. For College Algebra, the change was huge in the use of graphing calculators, as the first of the following comparisons confirms: 38% to 74%; 10% to 21%; 8% to 11%; 13% to 16%; and 4% to 5%. The patterns in Trigonometry and combined College Algebra/Trigonometry paralleled that of College Algebra. In particular, there was an increase from 49% to 67% in the number of sections in Trigonometry using graphing calculators and an increase from 51% to 86% in graphing calculator use in the combined course. In Precalculus/Elementary Functions, graphing calculator usage rose from 55% to 83%. In Finite Mathematics the rise was from 26% to 61%.

Comparison in Use of Reform Methods Between Two-Year and Four-Year Colleges in Fall 2000

In CBMS2000, instructional methodology data for two-year colleges was collected as a percentage of course *sections*. For four-year colleges, instructional methodology data was collected as a percentage of *enrollments*. If one assumes that at two-year colleges percentage of sections closely reflects percentage of enrollment, one can make some comparative statements about the use of reform methods of instruction in two-year and four-year colleges. The assumption is reasonable since few, if any, two-year colleges use the large lecture class format. Enrollment from class section to class section is relatively constant at two-year colleges.

See Chapter 5 of the current report for a discussion of instructional practices at four-year schools. There schools are broken down for analysis into PhD granting institutions, masters degree granting institutions, and baccalaureate only institutions.

In fall 2000, graphing calculators were a much more prevalent instructional tool in calculus courses at two-year colleges than at four-year colleges. For example, in mainstream Calculus I about 78% of sections at two-year colleges used such a calculator whereas at the other extreme only 40% of PhD granting institutions did so. In non-mainstream Calculus I this comparison was 72% to 27%. For both these calculus courses, BA and MA institutions fit between two-year colleges and doctoral institutions in their percentage of use of graphing calculators. In mainstream Calculus I their percentages were 67% and 55%, respectively. For non-mainstream Calculus I they were much closer to two-year colleges with percentages of 63% and 66%. The same pattern was present for Elementary Statistics where, for institutional degree type from Associate to PhD, the use of graphing calculators was 59%, 51%, 49%, and 38%, respectively.

Interestingly, a pattern similar to that for graphing calculators in the preceding paragraph is present with regard to other reform methodologies in the same three courses. Often, two-year colleges have more in common with BA and MA institutions than these latter have in common with PhD institutions. Here are the percentage data, given on each line in the following order:

- Writing assignments in mainstream Calculus I: 31%, 45%, 20%, and 19% .
- Writing assignments in non-mainstream Calculus I: 20%, 11%, 19%, and 12%.
- Writing assignments in Elementary Statistics: 50%, 52%, 33%, and 22%.

- Computer assignments in mainstream Calculus I: 35%, 41%, 35%, and 23%.
- Computer assignments in non-mainstream Calculus I: 15%, 5%, 23%, and 10%.
- Computer assignments in Elementary Statistics: 46%, 44%, 55%, and 48%.
- Group projects in mainstream Calculus I: 27%, 33%, 18%, and 10%.
- Group projects in non-mainstream Calculus I: 20%, 8%, 8%, and 9%.
- Group projects in Elementary Statistics: 35%, 32%, 12%, and 14%.

TABLE TYR.10 Percentage of sections using different instructional methods by course in Mathematics Programs in two-year colleges: Fall 2000.

		Percentage of sections taught using							
Course number	Type of Course	Graphing calculators %	Writing assignments %	Computer assignments %	Group projects %	Weekly computer lab %	Standard lecture method %	Distance learning %	Number of sections
1	Arithmetic	3	5	12	11	19	69	0.7	5,425
2	Pre-algebra	5	10	12	14	17	84	1.5	3,561
3	Elementary algebra (HS)	20	12	12	14	14	78	1.3	11,173
4	Intermed algebra (HS)	31	13	8	16	8	79	1,8	9,378
5	Geometry (HS)	32	4	3	6	2	86	4.9	354
6	College algebra	74	21	11	16	5	83	6.7	6,619
7	Trigonometry	67	12	4	10	3	89	0.8	1,291
8	College algebra & trig	86	15	11	15	1	75	2.8	592
9	Intro math modeling	87	73	24	86	26	79	0.9	329
10	Precalculus[1]	83	22	16	20	8	86	1.6	1,991
11	Mnstrm calculus I	78	31	35	27	17	79	1.6	2,298
12	Mnstrm calculus II	74	25	37	25	16	80	2.4	957
13	Mnstrm calculus III	69	21	35	23	15	74	1.1	686
14	Non-mstrm calculus I	72	20	15	20	6	77	3.1	728
15	Non-mstrm calculus II	73	39	24	8	19	68	19.4	57
16	Differential equations	52	14	26	17	11	65	1.5	290
17	Linear algebra	69	29	40	24	19	83	3.7	177
18	Discrete mathematics	47	40	23	30	8	53	0	157
19	Elementary statistics	59	50	46	35	28	79	5.8	2,794
20	Probability	56	55	59	4	48	87	2	144
21	Finite mathematics	61	17	8	18	3	79	0.4	750
22	Math for liberal arts	20	41	15	32	5	79	5.5	1,668
23	Math for elem tchrs	28	66	21	58	2	65	1.4	810
24	Business math[2]	8	8	17	10	12	75	4.9	379
25	Business math[3]	44	6	3	4	1	86	0	298
26	Tech math (non-calc)	36	16	13	13	6	82	0	717
27	Tech math (calc)	49	9	12	9	7	93	0	100
28	Data processing	31	30	20	23	12	76	3.8	695
29	Computers & society	0	90	93	17	87	82	0	105
30	Intro to software	0	62	99	43	99	19	6.5	771
31	Issues in CS	0	6	100	100	100	100	0	47
32	Cmptr programming I	0	27	97	17	87	60	0	285
33	Cmptr programming II	0	43	86	12	57	77	3.3	87
34	Adv prgm & data str	0	47	100	5	59	76	0	52
35	Database mgmt	0	0	56	11	53	15	6.3	69
36	Discrete math for CS	66	33	21	33	21	100	0	13
37	Other CS courses	0	2	98	1	92	71	3.1	648
	Total all courses	**37**	**19**	**18**	**18**	**15**	**78**	**2.5**	**56,495**

[1] Includes Precalculus, Elementary functions, and Analytic geometry.
[2] Not transferable for credit toward a bachelors degree.
[3] Transferable for credit toward a bachelors degree.

TABLE TYR.11 Percentage and number of Calculus sections in Mathematics Programs at two-year colleges that assign group projects and that have a writing component: Fall 1990, 1995, and 2000.

		Percentage of sections with group projects			Percentage of sections with a writing component			Number of sections		
Course number	Type of course	1990	1995	2000	1990	1995	2000	1990	1995	2000
11	Mainstream Calculus I	4	22	27	5	20	31	2062	2325	2298
12	Mainstream Calculus II	3	18	25	4	13	25	1004	1008	957
13	Mainstream Calculus III	0	22	23	4	16	21	782	733	686
14	Non-mstrm Calculus I	5	20	20	4	17	20	1148	1010	728
15	Non-mstrm Calculus II	2	22	8	2	16	39	na	75	57

Services Available to Students

Chapter 2 of the current report contains a comparison of academic and other related services available to four-year students and to two-year students. See Tables AR.7 through AR.12 in that chapter. Table TYR.12 gives the percentage of two-year college mathematics programs that offered various services to students in fall 2000.

Placement Testing, Tutorial Laboratories, Outreach Projects, Independent Study, Honors Programs, Programs for Minorities, and Programs for Women

Diagnostic or placement testing and tutorial labs were almost universal in availability. Two of the new items included for the first time in the 2000 survey were outreach projects to K–12 schools and opportunities for independent study. Respectively, 20% and 25% of two-year schools reported these as available. Only 4% of two-year schools reported that undergraduate research opportunities in mathematics were available to their students.

There was a 3 percentage point growth in the availability of honors sections of mathematics courses, when fall 1995 is compared to fall 2000. But such honors courses were available in fall 2000 at only 20% of two-year colleges. On the negative side of the ledger, special programs to encourage minorities in mathematics, which were available in 11% of two-year colleges in fall 1995, fell to 4% in fall 2000. Similarly, programs to encourage women in mathematics, which existed in only 8% of two-year college mathematics programs in fall 1995, fell to 4% in fall 2000. As regards these last two comparisons, the numbers refer to formally organized efforts within the mathematics program, not to the personal efforts of faculty members.

Faculty Advisors

Most eye-catching in Table TYR.12 was the 50% (32 percentage point) *drop* in schools which offered mathematics advising to students by members of the mathematics faculty. The magnitude of this drop in an area so central to the academic process raises the question if the data for this item in the fall 2000 survey were suspect. For example, had respondents in large numbers misunderstood the question? As likely, however, this percentage drop reflected a systematic move among two-year colleges to locate academic advising within a student services unit where generically trained individuals offered academic counseling in all subject areas.

If by fall 2000 mathematics course advising had experienced a major move from mathematics programs to student service units within the colleges, anecdotal evidence suggests the rationale for the move might be as follows. Much of the mathematics faculty (almost 70%) was part-time, and hence the full-time faculty was stretched thin to cover advising. The student body itself was very fluid—part-time, drop-in/drop-out, night only, week-end, working, non-residential—and not readily available on campus when the relatively few full-time permanent faculty were present. Hence, offering advising through a student services unit, where it could be tied directly to diagnostic and placement testing, would make advising accessible to more students.

Anecdotally, mathematics faculty complain about the accuracy of the advice students receive from non-mathematicians working in generic advising units. They point out that placement of students into the proper first mathematics course, and the interrelation of all mathematics courses, is much more complex than it is, say, for freshman/sophomore courses in English composition or American history. A worthy object for future CBMS surveys would be to investigate what steps mathematics programs take to improve the advising offered by student service units and to investigate the overall effect on mathematics instruction when advising takes place outside the discipline.

TABLE TYR.12 Percentage of the 1,053 two-year colleges offering various opportunities and services to Mathematics students: Fall 2000.

Opportunity/Service	1995	2000
Diagnostic or placement testing	98	98
Mathematics lab or tutorial center	93	98
Advising by a member of the Mathematics faculty	65	33
Opportunities to compete in Mathematics contests	29	28
Honors sections	17	20
Mathematics club	14	14
Special Mathematics programs to encourage minorities	11	4
Lectures/colloquia for students, not part of Math club	9	9
Special Mathematics programs to encourage women	8	4
K-12 outreach opportunities	na	20
Undergraduate research opportunities	na	4
Independent Mathematics studies	na	25
Other	2	4

Mathematics Labs

In fall 2000, about 98% of two-year colleges with mathematics programs had a mathematics lab or tutorial center. Table TYR.13 shows the services available in these mathematics labs. Almost all labs offered tutoring by students, with the percentage of such labs jumping from 84% to 96% between 1995 and 2000. Media such as videotapes, computer-aided instruction, and computer software were important lab tools. Somewhat less than half the labs offered tutoring by faculty, either full-time or part-time. The mathematics labs increasingly were staffed by students and paraprofessionals. These latter are non-faculty staff who may not hold collegiate degrees or collegiate degrees beyond the bachelors.

TABLE TYR.13 Percentage of the 1,032 two-year colleges with a Mathematics lab or tutorial center that offer various services to students: Fall 2000.

	Percentage of two-year colleges with Math lab/ tutorial center that offer various services to students	
Services offered in Mathematics lab or tutorial center	1995	2000
Computer-aided instruction	69	68
Computer software such as computer algebra systems or statistical packages	65	69
Media such as videotapes	70	74
Tutoring by students	84	96
Tutoring by paraprofessionals	58	68
Tutoring by part-time Mathematics faculty	39	48
Tutoring by full-time Mathematics faculty	38	42
Internet access	na	53

TABLE TYR.14 Percentage of two-year colleges using various sources of personnel for Mathematics lab or tutorial center: Fall 1985, 1990, 1995, and 2000.

	Percentage of two-year colleges using source			
Source	1985	1990	1995	2000
Students	48	73	84	96
Full-time members of the Mathematics staff	38	46	38	42
Paraprofessionals	34	51	58	68
Part-time members of the Mathematics staff	30	32	39	48

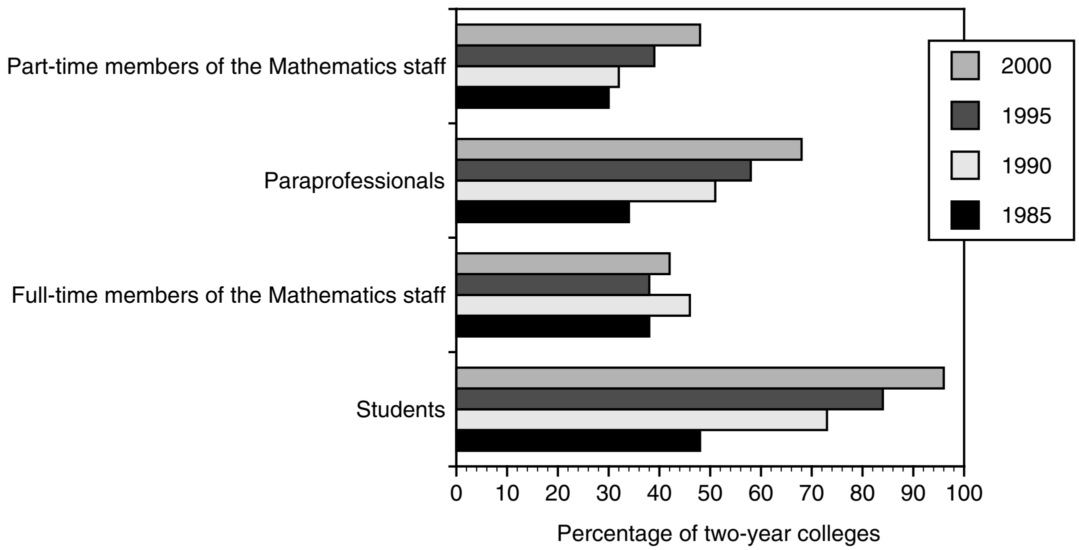

FIGURE TYR.14.1 Percentage of two-year colleges using various sources of personnel for Mathematics labs or tutoring centers: Fall 1985, 1990, 1995, and 2000.

Placement Into Courses

A comprehensive analysis across all institution types of the survey data on student placement into mathematics courses is given in Chapter 2 of the current report. See Tables AR.7 through AR.9. Some of the principal findings for two-year colleges are summarized in the next paragraph. On a comparative level, in fall 2000 two-year colleges were much more likely than four-year colleges or universities to require placement testing of their entering or first-time students (98% versus 49%) or to enforce mandatory course placement based on the test (67% to 47%). The gap also is large with regard to a required visit with an advisor before enrolling in a mathematics course: 79% at two-year colleges and 60% at four-year colleges.

Virtually all (98%, the same percentage as 1995) two-year colleges with mathematics programs had diagnostic or placement testing to help students decide which course to take, and 98% also *required* first-time enrollees to take a placement test. In 67% of two-year colleges (a drop of 7 percentage points from 1995), *placement* was mandatory. In 79% of two-year colleges, a student was required to speak with an advisor to discuss placement test results before registering for a first mathematics course. Locally written placement test materials were used in 99% of colleges while commercial tests came from American College Testing (ACT), the Educational Testing Service (ETS), and a variety of other test providers. The first two commercial sources were used, respectively, by 30% and 34% of two-year colleges. These last two percentages can be found in Table AR.9 in Chapter 2. Among two-year colleges, 85% reported periodic review of the effectiveness of their placement tests.

Mathematics Courses Taught Outside of Mathematics Programs

Two-year colleges have a long history of offering mathematics courses, especially developmental courses, in instructional units outside of the mathematics program. The pattern of this enrollment is affected by the institution's philosophy concerning developmental education: developmental students take all developmental courses (mathematics, reading, and writing) in a self-contained unit devoted to these students or developmental courses are offered as part of the disciplinary curriculum.

In 1970, the number of students enrolled in mathematics courses outside a mathematics program was 71,000 (not shown in Table TYR.15; see [CBMS, 1995, p. 103]). The percentages calculated below are based on this 1970 outside enrollment figure and give a long-lens historical perspective on the pattern of "outside" mathematics enrollment at two-year colleges.

For the twenty years after 1970, fueled mostly by enrollments in developmental courses outside of the mathematics programs, enrollments in "outside" mathematics courses grew dramatically. In 1990, they peaked at 181,000, a level that was 255% higher than in 1970. In 1995, they declined to 153,000, a level still 215% higher than 1970. In fall 2000, these "outside" enrollments declined again, reaching 118,000. This last decline represented a 35% shrinkage since the 1990 peak and a 23% shrinkage since 1995.

The reader again is cautioned to keep in mind two comments provided early in this chapter on how computer science enrollments *outside* of mathematics were reported in CBMS surveys prior to 1995 and how they are reported in 1995 and 2000. No computer science courses taught *outside* the mathematics program are included in Table TYR.16. Computing courses taught *within* mathematics programs are clearly labeled in Tables TYR.3 and 4 but are *not* included in TYR.2.

Within mathematics programs, enrollment in mathematics courses (including statistics; see TYR.2) from 1970 to 1990 grew 227%, somewhat less than the 255% enrollment growth in mathematics courses *outside* mathematics programs. In contrast, outside enrollment had fallen 35% since 1990, but *inside* enrollment in fall 2000 remained 4% higher than its 1990 level, despite an overall decline in mathematics enrollment from 1995 to 2000. Significantly, 71% of the outside enrollment drop recorded in Table TYR.15 was accounted for by two courses: Arithmetic and Elementary Algebra. Another 23% (total: 94%) of the outside enrollment drop is accounted for by two business mathematics courses.

Decline in Enrollment in Basic Skills Courses Outside Mathematics Programs

One can only conjecture the reasons for the large drop in outside arithmetic and elementary algebra enrollment noted in fall 2000. Since there was a 5% decline in "inside" mathematics program enrollment in these courses during the 1995 to 2000 period, the enrollment in these outside courses did not gravitate to mathematics programs. It is possible that fewer entering students needed these courses. Another possibility is that student instruction in this content was handled more often in a non-course setting, for example, via a computer tutorial, and no longer showed up in course enrollment figures. A third reason could be a restructuring of these developmental courses so that they were no longer classified as "Arithmetic" and "Elementary Algebra."

In the end, the most likely explanation is that this enrollment drop in outside arithmetic and elementary algebra courses simply paralleled the drop in mathematics program enrollment discussed earlier in this chapter and in Chapter 1. If so, however, the question remains why so large an enrollment drop took place in very beginning basic skills courses outside the mathematics program.

TABLE TYR.15 Estimated enrollment (in 1000s) in Mathematics and Statistics courses taught outside of Mathematics Programs at two-year colleges: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

	Enrollment (in 1000s)					
Type of course	1975	1980	1985	1990	1995	2000
Arithmetic/Pre-algebra	27	18	18	42	54	43
Elementary algebra (HS level)	na	na	na	38	41	27
Intermediate algebra (HS level)	na	na	na	27	10	10
College algebra	na	na	na	6	2	1
Trigonometry/Precalculus (college)	17	29	3	3	1	0
Calculus or Differential equations	4	8	0	4	1	0
Business mathematics	53	70	50	32	26	18
Statistics & probability	14	12	7	15	9	7
Technical mathematics	na	25	23	10	8	5
Other	12	10	4	4	1	7
Total	**127**	**172**	**105**	**181**	**153**	**118**

Note: 0 means less than 500 enrollments.

Organization of Mathematics Courses Outside the Mathematics Program

With respect to the organization of mathematics courses outside the mathematics program in fall 2000, 68% of the outside enrollments were in remedial courses taught either in a learning lab or in another department such as a developmental studies division. Most of the rest of the outside enrollment was in (non-transferable) business mathematics taught in a business division, an enrollment that also fell noticeably in fall 2000.

Tables TYR.15 and TYR.16 give the enrollments in mathematics courses that were offered *outside* of mathematics programs. These enrollments were estimated by mathematics program heads. Thus, they may not be as accurate as the numbers given for enrollment *within* mathematics programs.

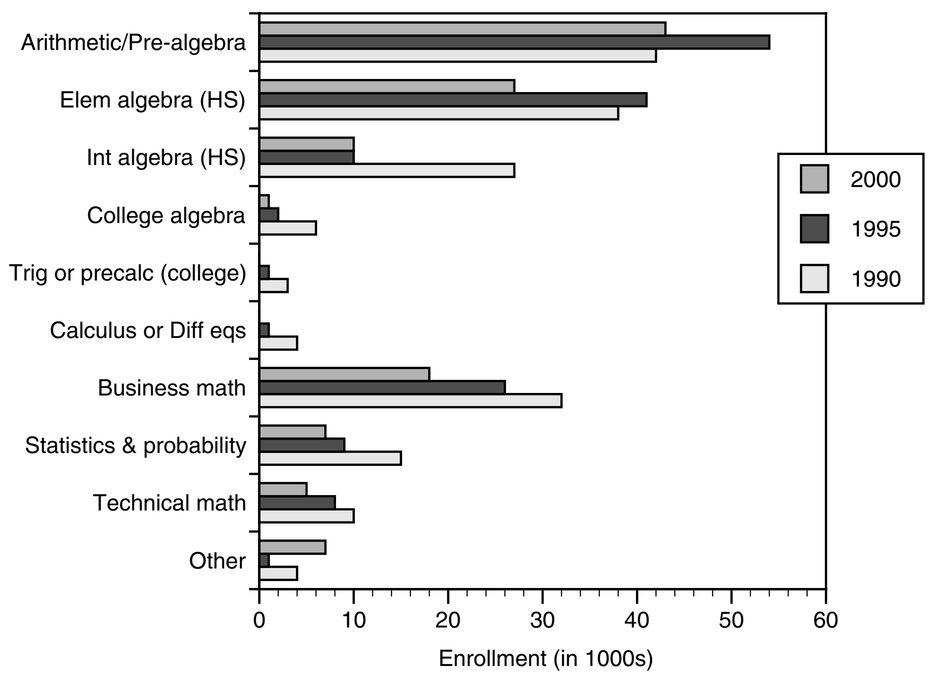

FIGURE TYR.15.1 Estimated enrollment (in 1000s) in Mathematics and Statistics courses taught outside of Mathematics Programs at two-year colleges: Fall 1990, 1995, and 2000.

TABLE TYR.16 Estimated enrollment (in 1000s) in Mathematics courses taught outside of Mathematics Programs at two-year colleges by division where taught: Fall 2000.

	Mathematics Enrollment (in 1000s) in Other Programs							
Course	Natural Sciences	Occupational Programs	Business	Social Sciences	Learning Center	Computer Science	Other Depts/ Divisions	**Total**
Arithmetic/Pre-algebra	0	0	1	0	8	0	33	**43**
Elem algebra (HS)	0	0	0	0	4	0	23	**27**
Intermed algebra (HS)	0	0	0	0	2	0	8	**10**
College algebra	0	0	0	0	0	0	1	**1**
Trig or Precalc (college)	0	0	0	0	0	0	0	**0**
Calculus or Diff equations	0	0	0	0	0	0	0	**0**
Business mathematics	0	0	17	0	0	0	1	**18**
Statistics & probability	0	0	5	1	0	0	1	**7**
Technical mathematics	0	4	0	0	0	0	1	**5**
Other	0	2	0	0	0	3	1	**7**
Total	**0**	**7**	**24**	**1**	**14**	**3**	**67**	**118**

Note: 0 means less than 500 enrollments, and this causes row and column sum inconsistencies in Table TYR.16.

The Supervision of Dual Enrollment Courses

In fall 2000, so-called dual enrollment courses were a growing phenomenon which affected two-year college mathematics programs. These courses generally earned credit both for high school graduation and at the two-year institution. In most cases, these courses were *not* outside the mathematics program in the technical sense of this CBMS survey. They had some level of supervision from the mathematics program, and most mathematics programs counted them among the courses offered by the program. However, these courses often were at the far edge of mathematics program supervision since they often were taught by the regular high school mathematics faculty who were hired and paid by the high school district.

Dual enrollment was one of the special topics studied in the CBMS2000 survey and is analyzed in Chapter 2 of the current report. See the DEN tables in that chapter, which are devoted to dual enrollment, especially DEN.16 through 18, and the discussion which accompanies the tables. Additional reference to dual enrollment, with regard to credentials and supervision of those who teach such courses, can be found in Chapter 7.

Chapter 7

Two-Year College Mathematics Program Faculty, Administration, and Special Topics

This chapter reports the number, teaching conditions, education, professional activities, age, gender, and ethnicity of the faculty in two-year college mathematics programs in fall 2000. Also included is information on mobility into, within, and out of two-year college mathematics program teaching positions. Further analysis of the items discussed in this chapter can be found in Chapters 1 and 2 of the current report 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 courses and pre-service teacher training.

The data are compared with those from the 1970, 1975, 1980, 1985, 1990, and 1995 CBMS surveys. Unlike surveys prior to 1995, the mathematics faculty surveyed in 1995 and in 2000 did not include those who teach in a computer science program that is separate from the mathematics program. Information on the sampling procedure used in the 2000 survey is in Appendix II. A copy of the two-year college questionnaire may be found in Appendix V.

Highlights

- Just under 7000 people taught as full-time permanent faculty in two-year college mathematics programs in the United States in fall 2000, an 8% drop from 1995. Another 961 individuals were teaching as temporary full-time faculty, an almost six-fold increase from the 164 temporary full-time faculty reported in 1995. See Table SF.6 in Chapter 1.
- For fall 2000, the number of part-time faculty was more than double the figure for full-time faculty and made up 69% of all mathematics faculty in two-year college programs. The proportional size of the part-time faculty, which had remained steady at 65% in 1990 and 1995, rose by 4 percentage points in fall 2000. See Table TYR.17.
- When the number of full-time temporary and part-time faculty teaching in fall 2000 in two-year college mathematics programs were combined, 70% of the faculty had status other than "full-time permanent."
- About 46% of all sections were taught by part-time faculty members. In addition, 52% of full-time permanent two-year college mathematics faculty members taught extra hours for extra pay at their own college. These are class sections which otherwise would have required additional part-time faculty teaching. See Tables TYR.9 and TYR.18.
- In fall 2000, a masters degree was the terminal degree for 81% of full-time permanent two-year college mathematics faculty. An additional 15% held doctorates. In fall 1995, the first percentage was an almost identical 82% and the second was 17%. However, in a startling change, the proportion of full-time permanent faculty who were newly hired in mathematics programs for 2000–2001 and who had only bachelors degrees was 19%, a very large increase from the 1% hired for academic year 1995–1996. See Tables TYR. 21 and TYR. 36.
- About 49% of full-time permanent faculty members in mathematics programs at two-year colleges in fall 2000 were women. For the first time, the proportion of men and women among the full-time permanent faculty was essentially equal. However, the lower proportion of women among permanent full-time faculty under age 40 and among newly hired full-time permanent faculty suggested this equality in numbers would not be maintained. See Tables TYR.24, TYR.25, and SF.8 in Chapter 1.
- About 13% of full-time permanent faculty members in mathematics programs at two-year colleges in fall 2000 were ethnic minorities. Ethnic minorities made up a higher proportion (20%) of the under-age-40 faculty than they did of the faculty as a whole. The percentage of ethnic minorities over age 54 was 21% in fall 2000. See Tables TYR.29, TYR.34, and TYR.37.
- The median age of full-time permanent faculty in two-year college mathematics programs was 48. The average age rose slightly since 1995, from 47.2 to 47.6. The proportion of the full-time permanent faculty over age 54 rose to 27%. See Table SF.9 in Chapter 1 and Table TYR.33.
- Selection patterns for the 572 new full-time permanent faculty hired for the academic year 2000–2001 showed unexpected characteristics. Only 13% of new hires had a doctorate as compared to 19% in 1995–1996. Only 8% were hired directly from graduate school compared to 30% in 1995. The

percentage of new hires chosen from current part-time or temporary faculty nearly doubled to 34%. As noted above, the percentage of new hires with a terminal bachelors degree jumped dramatically from 1% for academic year 1995–1996 to 19% for academic year 2000–2001, a possible harbinger of dramatic changes that could occur in the composition and orientation of faculty over the decade 2000 to 2010. See Tables TYR.35 and TYR.36.

- The number of institutions and mathematics programs requiring some form of continuing education or professional development for full-time permanent faculty almost doubled from 20% in 1995 to 38% in 2000.
- For the first time in CBMS surveys, in fall 2000 essentially all full-time permanent faculty had a computer or terminal in their office, up to 99% from 76% in 1995. There was an 8 percentage point increase in the number of part-time faculty who needed to share a desk with two other people (three or more to a desk), now at 51%. See Tables TYR.40 and TYR.41.
- More mathematics program heads (62%) classified too much need for remediation as the most important problem faced by their mathematics program. Low student motivation and the need to use too many part-time faculty were second and third. See Table TYR.45.
- Only 22% of two-year colleges assigned a faculty member to coordinate pre-service K-8 teacher education in either academic year 1999–2000 or 2000–2001, and only about half of two-year colleges offered a special mathematics course for pre-service K–8 teachers. (This finding also was included in the Chapter 6 highlights.) See Table PSE.3 and the related discussion in Chapter 2 and the discussion under Special Topics in this chapter.
- As noted in Chapter 2, in fall 2000 about 61% of two-year college mathematics programs reported full control over the selection of instructors for so-called dual enrollment courses, courses often taught on a high school campus by a high school teacher and for which a student received both high school and college credit. In fall 2000, dual enrollment courses made up about 14% (1726 of 11,995) of all college algebra, precalculus, and calculus course sections at two-year colleges. See Tables DEN.16, DEN.17, and DEN.18 in Chapter 2.
- A traditional mathematics or mathematics/computer science department was found in fewer than half (43%) of the two-year colleges with mathematics programs, and 10% of these were multi-campus departmental arrangements. More common was a division structure, where mathematics program administration was combined with science or other disciplines. See Table TYR.48.
- In 29% of two-year colleges, remedial/developmental mathematics courses were administered separately from the mathematics program. This was almost exactly the same percentage as in 1995. See survey question A–9 in Appendix V.

The Number and Teaching Assignments of Full-Time and Part-Time Mathematics Program Faculty

Trends in the Number of Full-Time Permanent Faculty and in the Use of Part-Time Faculty in Mathematics Programs at Two-Year Colleges, Including Those Paid by Third Parties

After steadily rising from 1980 to 1995, the number of full-time permanent faculty members in two-year college mathematics programs declined by 8% (618 faculty members) from fall 1995 to fall 2000. The fall 2000 total was 6,960, more than 4% lower than the 1990 level. At the same time, the number of part-time faculty continued to increase, as it had in each CBMS report since 1975, and reached 14,887 in fall 2000, an increase of 4% over 1995 levels. The figure 14,887 refers only to part-time faculty paid by two-year colleges. In fall 2000, the CBMS survey for the first time asked about part-time faculty who were paid by some third party. When the part-time faculty paid by a third party were included, the number of part-time faculty rose by another 776 and the percentage increase from 1995 levels was almost 10%.

Part-time faculty paid by a third party most frequently were employed by a local school district as high school teachers and were assigned to teach high school courses for which a two-year college granted simultaneous college credit. Such courses are called dual enrollment courses. In fall 2000, part-time faculty paid by a third party and usually teaching such dual enrollment courses accounted for about 5% of the total part-time faculty in two-year college mathematics programs. A complete analysis of dual enrollment data appears in Chapter 2.

If part-time faculty paid by a third party are combined with all other part-time faculty, then part-time faculty represented 69% of all two-year college mathematics program faculty (excluding full-time temporary faculty). That figure was above the 65% reported in CBMS1995 and CBMS1990, and was well above the 54% and 31% levels reported in 1980 and 1970, respectively. (All of these percentages also excluded full-time temporary faculty.) Hence, the proportional size of the part-time mathematics faculty, which held steady from 1990 to 1995, again rose from 1995 to 2000.

When the 961 full-time temporary faculty reported in fall 2000 were included in the base, part-time faculty composed 66% (15,663 of 23,585) of the total faculty, not 69%. However, as was discussed in detail in Chapter 1 (Table SF.6), 961 was an unusually large number of full-time temporary faculty, six-fold higher than in 1995.

Perhaps the most revealing percentage about the faculty structure in two-year college mathematics programs in fall 2000 came from combining the count of full-time temporary and part-time faculty. When this was done, 70% (16,624 of 23,585) of faculty had status other than "full-time permanent." In other words, programs typically ran on 30% (by head count) full-time permanent teaching staff.

Part-time faculty members taught about 46% of all mathematics program sections, an increase of 8 percentage points since 1995. See Table TYR.9. Not surprisingly, 62% of mathematics program heads classified the "need to use part-time faculty for too many courses" as somewhat of a problem or a major problem for the program. See Table TYR.46. However, this dissatisfaction percentage was 17 percentage points lower than it was in 1995.

TABLE TYR.17 Number of full-time permanent faculty, and number of part-time faculty, including part-time faculty paid by a third party (e.g., dual-enrollment instructors) in Mathematics Programs of two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

	1970	1975	1980	1985	1990	1995	2000
Full-time permanent faculty	4879	5944	5623	6277	7222	7578	6960
Part-time faculty[1]	2213	3411	6661	7433	13680	14266	14887
Part-time, paid by third party	na	na	na	na	na	na	776

[1] Figures in this row do not include part-time faculty paid by a third party.

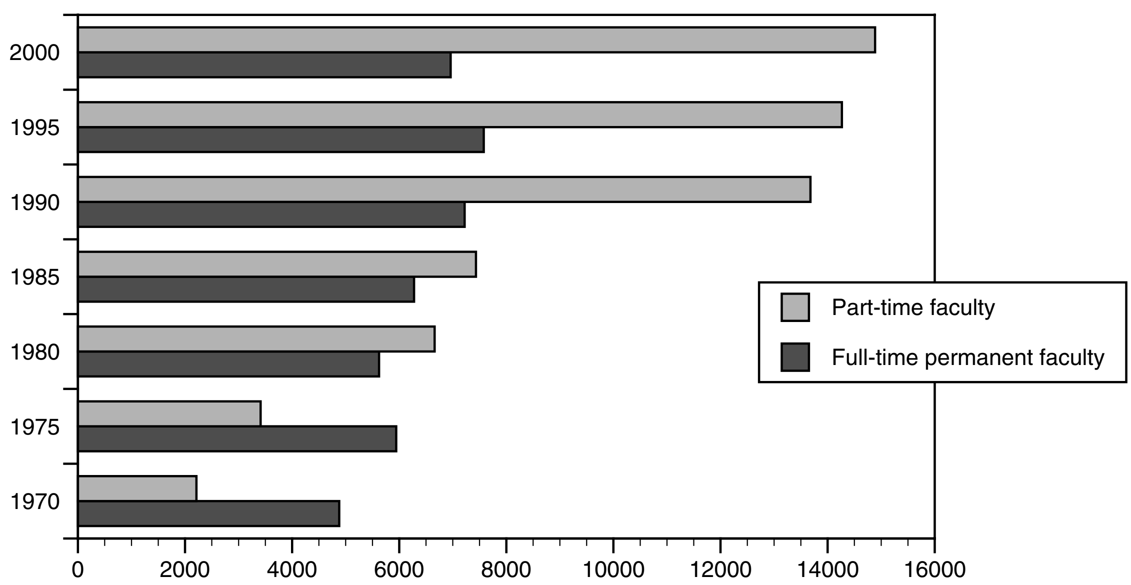

FIGURE TYR.17 Number of full-time permanent faculty and part-time faculty in Mathematics Programs in two-year colleges: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

Teaching Assignment of Full-Time Permanent and Part-Time Faculty

The average required teaching assignment in weekly contact hours for a full-time permanent two-year college mathematics faculty member in fall 2000 was 14.8. In 1995 this figure was 15.8. See Table TYR.18. In 1990, the number was 14.7 hours and in 1985 it was 16.1 hours.

Previous CBMS surveys found regional differences, with average teaching assignments highest in the west and lowest in New England and in some mid-Atlantic states. In 2000, the weekly hourly classroom teaching obligation was generally similar across the entire country. The only exceptions to this were a few states in the East (New York, New Jersey, and Pennsylvania) reporting weekly teaching assignments slightly below the average and a few states in both the mid-Atlantic (North and South Carolina) and the mid-west (Michigan, Illinois, Iowa, and Nebraska) reporting teaching assignments slightly above the average.

TABLE TYR.18 Teaching assignment for full-time permanent faculty in Mathematics Programs at two-year colleges: Fall 2000. (1995 data in parentheses)

Teaching assignment in contact hours	<10	10 to 12	13 to 15	16 to 18	19 to 21	>21
Percentage of two-year colleges	0 (2)	12 (2)	72 (68)	13 (14)	3 (14)	0 (1)
Average contact hours for full-time permanent faculty: 14.8 (15.8)						
Percentage of the full-time permanent Mathematics faculty who teach extra hours for extra pay at their own two-year college: 52% (48%)						
Average number of extra hours for extra pay: 3.6 (4.4)						
Percentage of full-time permanent Mathematics faculty who teach additional hours at another school: 6% (na)						

Note: 0 means less than half of 1%. See also Appendix II, p. 187, and Table A2.5.

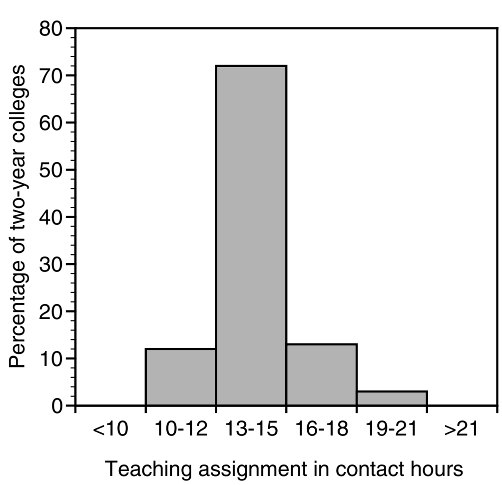

FIGURE TYR.18.1 Percentages of full-time permanent faculty having various teaching assignments in Mathematics Programs at two-year colleges: Fall 2000.

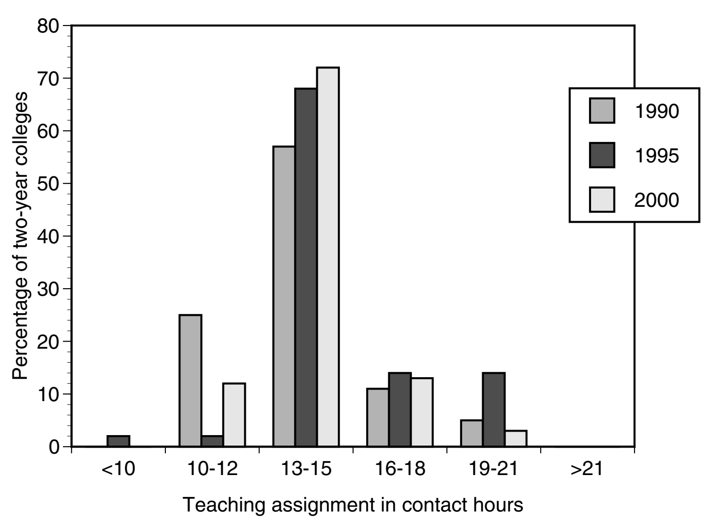

FIGURE TYR.18.2 Percentage of permanent full-time faculty with various teaching assignments in Mathematics Programs at two-year colleges: Fall 1990, 1995, and 2000.

About 54% of the 14,887 part-time faculty members in two-year college mathematics programs, that is, 54% of those paid directly by the college, taught six credit hours or more. In 37% of the colleges, office hours were required of part-time faculty, almost identical to the 39% reported in 1995. In 71% of the colleges, part-time faculty were paid on the same pay scale as full-time faculty members who taught extra hours for extra pay, an 11 percentage point jump since 1995. In 2% of colleges part-timers were paid more, and in 27% paid less, than full-time faculty who taught extra courses. The trend is clear: an ever- increasing number of part-time faculty and full-time faculty when teaching extra courses are paid at the same course rate.

Extra Teaching by Full-Time Faculty and Other Occupations of Part-Time Faculty

Table TYR.18 also shows that 52% of all full-time permanent two-year college mathematics faculty members taught extra hours for extra pay at their own two-year college. An additional 6% taught at other schools. The average number of extra hours for extra pay taught at their own college was 3.6. In 1995, the percentage was 48% and the number of hours 4.4. In 1990, the percentage was 44% and the average number of hours was 4.7. So, over the decade from 1990 to 2000, a higher percentage of full-time permanent faculty taught extra hours for extra pay, but the average number of hours per semester declined.

About 41% of the 14,887 part-time two-year college faculty members reported in TYR.17 were not employed full-time elsewhere and were not graduate students. See Table TYR.19. In 1995, the percentage was 35% and in 1990 and 1985 these percentages, respectively, were 27% and 21%. The percentage who were employed full-time in a high school and who taught extra classes as a part-time faculty member at the two-year college, usually at night, continued to drop from 37% in 1985 to 30% in 1990 to 28% in 1995 and finally to 25% in 2000.

TABLE TYR.19 Percentage of part-time faculty in Mathematics Programs at two-year colleges having various other occupations: Fall 1995 and 2000.

	Percentage of part-time faculty	
Other occupations of part-time faculty	1995	2000
Employed full-time in:		
a high school	28	25
another department at the same college	6	7
another two-year college	2	2
a four-year college	3	2
industry or other	20	20
Graduate student	5	3
No full-time employment and not a graduate student	35	41
Number of part-time faculty	**100%**	**100%**
	14266	**14887**

Education of Two-Year College Mathematics Program Faculty

Highest Degree of Full-Time Permanent Faculty, Including Newly Hired

A masters degree was the terminal degree of 81% of the full-time permanent two-year college mathematics faculty, almost identical to the 1995 percentage, namely, 82%. As shown in Table TYR.20, the percentage of faculty with a doctorate dropped from 17% to 16%. The percentage whose terminal degree was a bachelors degree rose to 3%.

Some important changes were observed in the educational level of new faculty hires for 2000–2001. See Table TYR.36. About 19% of new hires for 1995–1996 had a doctorate, but only 13% did for 2000–2001. New hires with terminal masters degrees dropped 14 percentage points, but new hires with terminal bachelors degrees rose 18 percentage points.

The 2000–2001 new hires reversed the trend reported in the 1995 survey that two-year colleges were hiring more new full-time permanent faculty members with doctorates than they had previously. Prior to 1995, CBMS surveys found that two-year

TABLE TYR.20 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by highest degree: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

	Percentage of full-time permanent faculty						
Highest degree	1970	1975	1980	1985	1990	1995	2000
Doctorate	4	11	15	13	17	17	16
Masters	89	82	80	82	79	82	81
Bachelors	7	7	5	5	4	1	3
Number of full-time permanent faculty	**100%** **4879**	**100%** **5944**	**100%** **5623**	**100%** **6277**	**100%** **7222**	**100%** **7578**	**100%** **6960**

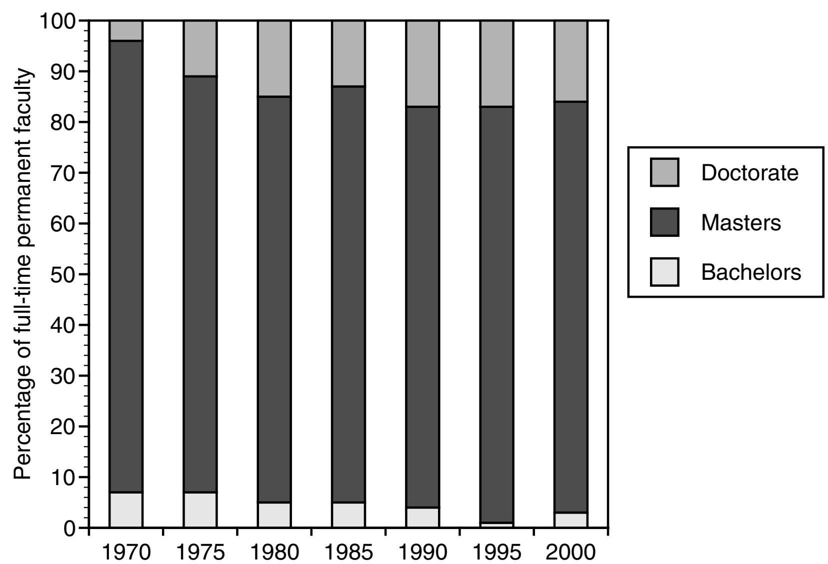

FIGURE TYR.20.1 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by highest degree: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

colleges hired very few full-time permanent faculty with doctorates and that faculty earned their doctorates while on the job. The 1990 survey found, for example, that 2% of new hires had doctorates, rising to 19% in 1995. Hiring of doctorates at two-year colleges for 2000–2001, in comparison to 1995–1996, may have been affected negatively by the improved job market for doctoral graduates at four-year colleges and universities in that year. Or it may be that two-year college mathematics programs were returning to an earlier hiring pattern of choosing fewer doctoral faculty.

The 2000–2001 hiring of such a large percentage of candidates with terminal *bachelors* degrees may reflect the increasing percentage of developmental students *within* mathematics programs. See Table TYR.4 and the relevant commentary in Chapter 6. Continuation of this hiring pattern, however, at a time when large numbers of first generation full-time permanent mathematics program faculty are poised to retire, could have a dramatic effect on the composition and orientation of two-year college mathematics programs over the next decade.

Table TYR.21 gives the academic major of the highest degree of full-time permanent two-year college mathematics faculty. These percentages are almost identical to the 1995 numbers. As in 1995, about 66% of those with masters degrees had mathematics as a major. About 47% of the doctorates were in mathematics. Mathematics education was second in both categories.

TABLE TYR.21 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by field and highest degree: Fall 2000.

	Percentage having as highest degree			
Field	Doctorate	Masters	Bachelors	**Total**
Mathematics	7	54	1	**62**
Mathematics Education	5	18	1	**24**
Statistics	1	2	0	**3**
Computer Science	0	1	0	**1**
Other fields	2	6	0	**9**
Total	**16**	**81**	**3**	**100%** **6960**

Note: 0 means less than half of 1%.

Highest Degree of Part-Time Faculty

Tables TYR.22 and TYR.23 summarize data on the highest degrees held by part-time faculty and their fields of specialization. Overall, in fall 2000 a large majority (70%) of part-time faculty held a masters degree as their highest degree and 24% held a bachelors degree as their highest degree. The remaining 6% were doctoral faculty. The 24% figure was a 6 percentage point rise over 1995 levels, but remained below the 27% figure found in 1990. The increase in part-time faculty holding bachelors degrees as their highest degree marked a reversal of a ten-year trend.

In fall 2000, 45% of all part-time faculty in two-year college mathematics programs held their highest degree (Ph.D., MA, or BA) in mathematics, and that represented a substantial decline of 13 percentage points since 1995. Just over a quarter held their highest degree in mathematics education, slightly more than in 1995. A variety of other fields of specialization were sparsely represented among the highest earned degrees of part-time mathematics faculty. Closer examination of the data revealed some potentially disturbing trends. There was a 10 percentage point decline in the percentage of masters level mathematics program faculty holding degrees in mathematics, and a 5 percentage point increase in bachelors-level faculty who hold their degrees outside of the mathematical sciences. These trends deserve careful monitoring.

TABLE TYR.22 Percentage of part-time faculty in Mathematics Programs at two-year colleges by highest degree: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

	Percentage of part-time permanent faculty						
Highest degree	1970	1975	1980	1985	1990	1995	2000
Doctorate	9	4	7	7	8	7	6
Masters	77	79	76	65	65	76	70
Bachelors	14	17	17	28	27	18	24
Number of part-time	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
permanent faculty	**2213**	**3411**	**6661**	**7433**	**13680**	**14266**	**14887**

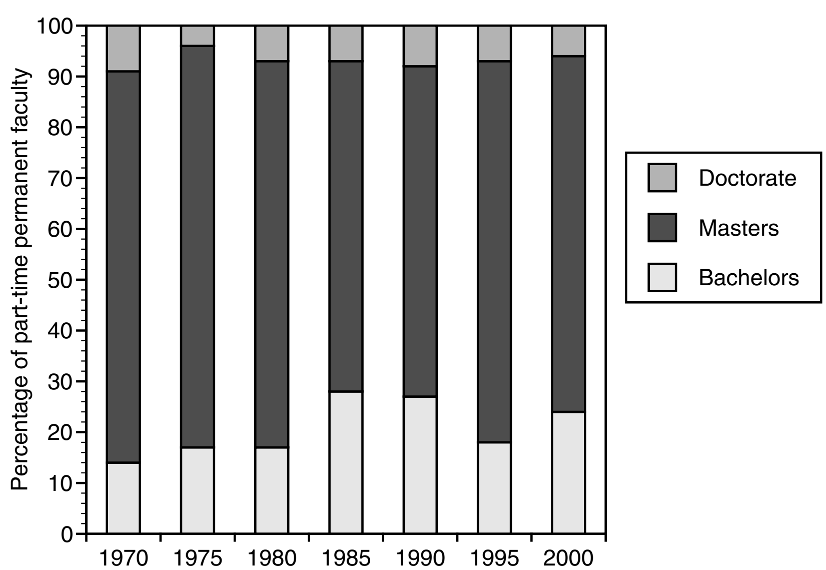

FIGURE TYR.22.1 Percentage of part-time faculty in Mathematics Programs at two-year colleges by highest degree: Fall 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

TABLE TYR.23 Percentage of part-time faculty in Mathematics Programs at two-year colleges by field and highest degree: Fall 2000. (1995 data in parentheses.)

	Percentage having as highest degree			
Field	Doctorate	Masters	Bachelors	**Total**
Mathematics	2	33	10	**45**
Mathematics Education	1	20	5	**26**
Statistics	1	2	1	**4**
Computer Science	0	1	0	**1**
Other fields	2	14	8	**24**
Total	**6**	**70**	**24**	**100%**
	(7)	**(76)**	**(18)**	

Note: 0 means less than half of 1%.

Gender, Ethnic Composition, and Age of Full-Time Permanent Two-Year College Mathematics Program Faculty

Gender of Full-Time Permanent Two-Year College Mathematics Program Faculty

A steady increase in the percentage of women among full-time permanent mathematics program faculty was reported in every CBMS study since 1975. In fall 2000, the percentage of women faculty reached 49%, which is essentially equal to the percentage of male faculty (51%).

However, other fall 2000 data suggested this equality of numbers might be difficult to maintain over the long term. In fall 2000, the proportion of women in the under 40 age group among full-time permanent faculty in mathematics programs at two-year colleges was 45%, less than their representation in the entire full-time permanent faculty. See the data in Table SF.8 in Chapter 1 where the reader can find a comprehensive review of mathematics faculty gender patterns at institutions of all levels.

Also acting counter to long-term numerical equality for women, nearly achieved in fall 2000, was the fact that only 42% of new hires for 2000–2001 were women as reported in Table TYR.37. The 42% figure for new hires was well below the 49% overall proportion of women in the full-time permanent faculty and even below the new hire percentage of 44% for 1995–1996.

Finally, in evaluating the CBMS2000 data about gender of newly hired faculty, it is important to keep in mind the gender composition of the pool of newly-granted mathematics masters degrees. The percentage of women among the 3,643 mathematics masters degree recipients in the U.S. was 41% during academic year 1997–1998, the latest year for which firm data was available as the current report was being written. That percentage was essentially the same in 1992–1993, the figure reported in CBMS1995. In each CBMS report from 1970 to 1985, the percentage was 35% or less. This information is summarized in Table TYR.25, whose data are from the NCES surveys referenced earlier. The proportion of women among the recipients of masters degrees in mathematics is an important influence on long-term faculty gender composition at two-year colleges.

TABLE TYR.24 Number and percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by gender: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

	1975	1980	1985	1990	1995	2000
Men	4696	4217	4331	4767	4579	3537
	(79%)	(75%)	(69%)	(66%)	(60%)	(51%)
Women	1248	1406	1946	2455	2999	3423
	(21%)	(25%)	(31%)	(34%)	(40%)	(49%)
Total	**5944**	**5623**	**6277**	**7222**	**7578**	**6960**
	(100%)	**(100%)**	**(100%)**	**(100%)**	**(100%)**	**(100%)**

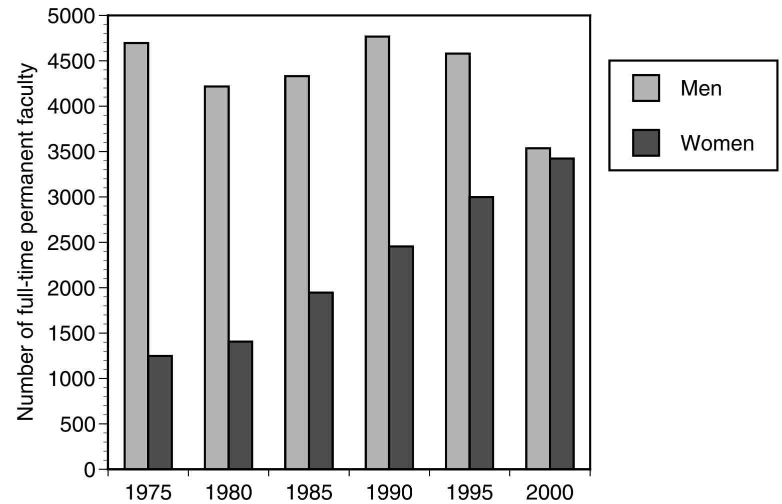

FIGURE TYR.24.1 Number of full-time permanent faculty in Mathematics Programs at two-year colleges by gender: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

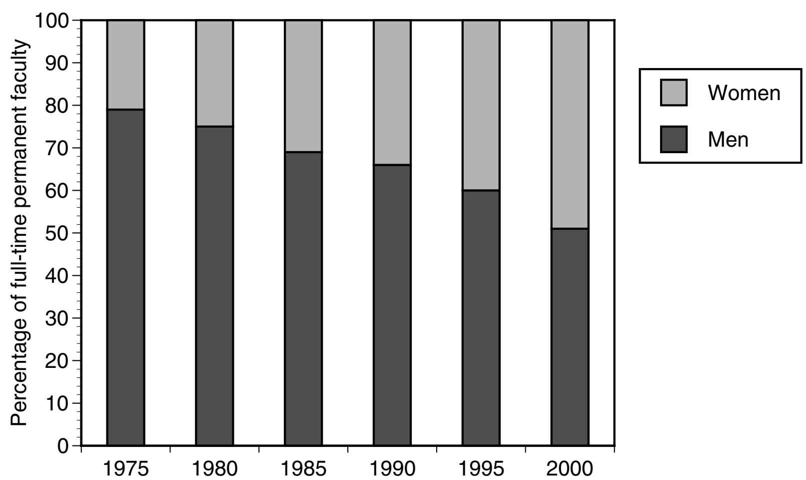

FIGURE TYR.24.2 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by gender: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

TABLE TYR.25 Percentage of full-time permanent faculty and part-time faculty in Mathematics Programs at two-year colleges by gender: Fall 2000. Also master's degrees in Mathematics granted in the U.S. by gender in 1997-98.

	Percentage of		
	Full-time permanent faculty	Part-time faculty	Master's degrees in mathematics granted in the U.S. in 1997–98[1]
Men	51	57	59
Women	49	43	41
Total	**100%**	**100%**	**100%**
	6960	**14887**	**3643**

[1] Digest of Education Statistics, 2000, National Center for Education Statistics IPEDS Annual Completion Survey. (These figures include resident aliens.)

Ethnicity Among Full-Time Permanent and Part-Time Two-Year College Mathematics Program Faculty

Tables TYR.26, TYR.27, TYR.28, and TYR.29 present data on ethnic minority demographics for full-time permanent mathematics faculty in two-year colleges. The first two tables provide an historical perspective, while the latter two present more detailed information on the ethnic profile of the full-time permanent mathematics faculty, including information about both age and gender.

From 1995 to 2000, the overall number of full-time permanent mathematics faculty in two-year colleges decreased by about 8%. Although the total number of ethnic minority faculty also declined, the percentage of ethnic minorities among the full-time permanent mathematics faculty remained at about 13%. That percentage is three points below the level reported in CBMS1990.

The relative sizes of most ethnic groups changed little between 1995 and 2000. Black (non-Hispanic) faculty composed the largest ethnic minority group (about 5% of the full-time permanent faculty) while Asian and Hispanic faculty accounted for 4% and 3%, respectively.

TABLE TYR.26 Percentage and number of ethnic minority full-time permanent faculty in Mathematics Programs at two-year colleges: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

	1975	1980	1985	1990	1995	2000
Percentage of ethnic minorities among full-time permanent faculty	7	8	12	16	13	13
Number of full-time permanent ethnic minority faculty	416	450	753	1155	948	909
Number of full-time permanent faculty	5944	5623	6277	7222	7578	6960

TABLE TYR.27 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by ethnicity: Fall 1980, 1985, 1990, 1995, and 2000.

	Percentage of full-time permanent faculty				
Ethnic Group	1980	1985	1990	1995	2000
Asian/Pacific Islander	3	3	4	4	4
Black (non-Hispanic)	3	4	4	5	5
American Indian/Eskimo/Aleut	1	1	1	0	1
Mexican American/Puerto Rican/ other Hispanic	1	4	7	3	3
White (non-Hispanic)	92	88	84	87	85
Status unknown	na	na	na	1	2
Number of full-time permanent faculty	**100%** **5623**	**100%** **6277**	**100%** **7222**	**100%** **7578**	**100%** **6960**

Note: 0 means less than half of 1%.

CBMS2000 detected what might be a major change in the gender ratio within certain ethnic groups of mathematics program faculty. Among black (non-Hispanic) full-time permanent faculty, for example, the percentage of women dropped from 42% in fall 1995 to 28% in fall 2000. Among white (non-Hispanic) faculty, the percentage of women rose from 40% to 50%. But a word of caution is in order: compared to CBMS1995, the CBMS2000 survey reported a large increase in the percentage of women whose ethnicity was unknown.

The percentage of ethnic minority full-time permanent mathematics faculty under the age of 40 did not change from fall 1995 to fall 2000, remaining at 20%. The NCES surveys for the most recent five year periods available at the time of the writing of the current report, namely, for 1992–1993 and for 1997–1998, showed an increase (13% to 19%) in the percentage of ethnic minorities among U.S. recipients of masters degrees in mathematics. See the NCES web page referenced above (http://nces.ed.gov/pubs2001/2001034c.pdf) and Table TYR.29. This is encouraging information about the increased availability of ethnic minority faculty for two-year college mathematics programs.

For information about ethnic minority faculty over age 54, see Table TYR.34. Data on ethnicity of newly hired faculty for academic year 2000–2001 appear in Table TYR.37.

TABLE TYR.28 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: Fall 2000.

Ethnic group	Number of full-time permanent faculty	Percentage of ethnic group in full-time permanent faculty	Percentage of women in ethnic group
Asian/Pacific Islander	273	4	36
Black (non-Hispanic)	361	5	28
American Indian/Eskimo/Aleut	85	1	30
Mexican American/Puerto Rican/ other Hispanic	190	3	40
White (non-Hispanic)	5903	85	50
Status not known	148	2	37
Total	**6960**	**100**	**49**

TABLE TYR.29 Percentage of full-time faculty and of full-time faculty under age 40 in Mathematics Programs at two-year colleges by ethnic group: Fall 2000. Also U.S. master's degrees in mathematics granted to U.S. residents by ethnic group in 1997–98.

Ethnic Group	Percentage among all full-time permanent faculty	Percentage among full-time permanent faculty under age 40	Master's degrees in mathematics granted in the U.S. in 1997–98[1]
Ethnic minorities	13	20	19
White (non-Hispanic)	85	77	81
Unknown	2	3	0
Total	**100%** **6960**	**100%** **1392**	**100%** **2615**

[1] 2000 Digest of Education Statistics, National Center for Education Statistics.

In fall 2000, about 13% of part-time faculty were members of ethnic minorities, almost identical to 1995. See Table TYR.30. African Americans made up the largest group, comprising 6% of the total part-time faculty. See Table TYR.31.

TABLE TYR.30 Percentage of ethnic minority part-time faculty in Mathematics Programs at two-year colleges: Fall 2000.

Percentage of ethnic minorities among part-time faculty	13
Number of part-time faculty	14887

TABLE TYR.31 Number and percentage of part-time faculty in Mathematics Programs at two-year colleges by ethnic group and percentage of women within ethnic groups: Fall 2000.

Ethnic group	Number of part-time faculty	Percentage of ethnic group among all part-time faculty	Percentage of women within ethnic group
Asian/Pacific Islander	528	4	38
Black (non-Hispanic)	920	6	37
American Indian/Eskimo/Aleut	8	0	40
Mexican American/Puerto Rican/ other Hispanic	440	3	35
White (non-Hispanic)	12263	82	45
Status not known	728	5	50
Total	**14887**	**100**	**43**

Note: 0 means less than half of 1%.

Age Distribution of Full-Time Permanent Two-Year College Mathematics Program Faculty

In fall 2000, the median age of full-time permanent faculty in two-year college mathematics programs was 48. The average age rose slightly to 47.6 years from its 1995 level of 47.2 years. For comparison, the average age in 1990 was about 45.4 years. See Table SF.9 and the discussion in Chapter 1 for a more comprehensive analysis of the age patterns of collegiate mathematics faculty at both four-year and two-year colleges.

As shown in Table TYR.32, the percentage of full-time permanent faculty who were under age 40 slid gradually from 47% in 1975 to 21% in 1995. It *rose* to 26% in 2000, a sign of a swing toward a younger faculty as first generation two-year college mathematics faculty begin to retire in larger numbers. At the other end of the age range, the percentage of full-time permanent faculty over age 54 had grown from 12% in 1975 to 18% in 1995 and reached 27% in 2000, a full quarter of the full-time permanent mathematics faculty.

Women were a majority in the 45–54 year old group and less heavily represented in the over 54 age group. Otherwise, in terms of age, as reflected in TYR.33, their distribution in the faculty matched that of males. Ethnic minorities tended to be younger than the faculty as a whole. For example, 21% of ethnic minority faculty in fall 2000 were over age 54 as compared to 27% of the full-time permanent faculty overall. See Tables TYR.33 and TYR.34.

In spite of the large proportional increase in full-time permanent faculty over age 54, the average age of the faculty did not rise much from 1995 to 2000 because of an increase in the size of the 35–45 age group and a decrease in the size of the 45–55 age group.

TABLE TYR.32 Percentage and number of full-time permanent faculty in Mathematics Programs at two-year colleges by age: Fall 1975, 1980, 1985, 1990, 1995, and 2000.

Age	Percentage of full-time permanent faculty						Number of full-time permanent faculty					
	1975	1980	1985	1990	1995	2000	1975	1980	1985	1990	1995	2000
<30	9	5	5	5	5	4	535	281	314	361	358	290
30–34	18	15	11	8	8	9	1070	843	690	578	580	615
35–39	20	24	18	10	8	13	1188	1350	1130	722	633	890
40–44	15	18	24	21	14	11	892	1012	1506	1517	1044	763
45–49	13	16	18	22	22	15	773	900	1130	1589	1672	1075
50–54	13	10	13	21	26	20	773	562	816	1517	1933	1418
55–59	8	7	7	8	13	16	475	394	439	578	966	1146
>59	4	5	4	5	5	11	238	281	252	360	391	763
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**5944**	**5623**	**6277**	**7222**	**7578**	**6960**

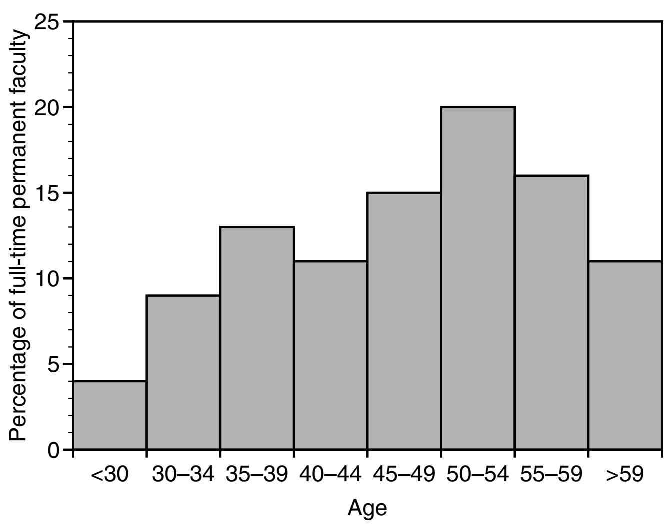

FIGURE TYR.32.1 Percentage distribution of full-time permanent faculty in Mathematics Programs at two-year colleges by age: Fall 2000.

TABLE TYR.33 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by age and by gender. Also percentage of women by age: Fall 2000.

Age	Percentage of full-time permanent faculty		Percentage of women in age group
	Women	Men	
<35	6	7	49
35–44	12	12	49
45–54	20	16	56
>54	10	17	36
Total	**49%**	**51%**	

TABLE TYR.34 Percentage of ethnic minority full-time permanent faculty in Mathematics Programs at two-year colleges by age: Fall 1980, 1985, 1990, 1995, and 2000.

	Percentage of ethnic minority full-time permanent faculty				
Age	1980	1985	1990	1995	2000
<35	28	27	24	18	20
35–44	38	46	43	26	31
45–54	30	20	29	35	28
>54	4	7	4	21	21
Number of ethnic minority full-time permanent faculty	**100%** **450**	**100%** **753**	**100%** **1155**	**100%** **948**	**100%** **909**

Demographics of Full-Time Permanent Faculty Newly Hired for 2000–2001

Two-year college mathematics programs hired about 572 new full-time permanent faculty for 2000–2001. This was an eye-catching 63% increase over 1995–1996 when about 350 people were newly hired. See Table TYR.35. In 1990, the corresponding number of full-time permanent hires was about 600, the other end of an interesting bi-modal hiring count during the decade of the 1990s.

Important new hiring patterns emerged in 2000–2001 in comparison to 1995–1996. In 1995, 30% of new faculty were hired directly out of graduate school, about the same percentage as in 1990. In 2000, this fell to 8%. Similarly, the percentage of new hires previously teaching at a four-year institution dropped 8 percentage points to 10%. By contrast, hiring from among part-time faculty at the same institution almost doubled to 34%. The percentage of secondary school teachers among newly hired faculty rose from 4% to 22%, thereby returning to a pattern prevalent in the early years of community colleges. (A 1979 survey found that more than 60% of all mathematics faculty in two-year colleges had previously taught in secondary schools. [Robert McKelvey, Donald J. Albers, Shlomo Liebeskind, and Don O. Loftsgaarden, An Inquiry into the Graduate Training Needs of Two-Year College Teachers of Mathematics. Rocky Mountain Mathematics Consortium, 1979.])

Educational Credentials of Newly Hired Full-Time Permanent Faculty

In fall 2000, about 13% of the new hires had a doctorate, a drop of 6 percentage points from 1995. See Table TYR.36. Perhaps the improved employment opportunities at four-year colleges and universities for new mathematics Ph.D.'s in the late 1990's reduced the number of doctoral faculty seeking positions in two-year colleges. However, in light of the data on increased hiring of new faculty with bachelors degrees, namely, 19% for 2000–2001 in contrast to 1% for 1995–1996, the drop in doctoral hiring may be another piece of evidence of a shift at two-year colleges away from hiring those with degrees beyond what accrediting agencies minimally require. (Most accrediting agencies require that two-year college faculty who teach courses which transfer for baccalaureate degree credit hold a masters degree with an 18-credit concentration in the academic field in which they are teaching. Faculty who teach remedial or developmental courses are required to hold a bachelors degree with a major in the subject in which they teach.)

If this pattern of educational credentials for new hires becomes a long-term hiring strategy, it could be short-sighted. In particular, as recorded in Table TYR.36, the percentage of masters degrees among new hires was 66% for 2000–2001, compared to 80% for 1995–1996. The 66% figure was far below the masters degree percentage (81%) of the mathematics faculty as a whole. The effect of repeated future hiring in the 2000–2001 proportions would be a rapid drop in the percentage of masters degrees among full-time permanent mathematics faculty within two-year college mathematics programs. This could lead to a two-tiered faculty within mathematics programs, to an overall change in program philosophy and cohesiveness, and to conflicts with four-year colleges and universities on course comparability and transferability.

Gender and Age of Newly Hired Full-Time Permanent Faculty

For 2000–2001, about 42% of the new hires were women. As noted earlier, this is less than the overall 49% of women in the entire full-time permanent faculty. Table TYR.37 shows that white non-Hispanic faculty comprised 86% of new hires for 2000–2001. Overall, 13% of new hires were ethnic minorities, a 4 percentage point drop in ethnic minority hiring when 2000–2001 is compared to 1995–1996.

Table TYR.38 gives the percentage of new hires whose ages fall in 5 year intervals beginning at age 30. As would be expected, almost 70% of new hires were under age 40 and 80% were under age 50. Especially interesting is the large percentage (58%) of hires between 30 and 39 years old. This suggests, as does other data, that fewer new full-time permanent mathematics faculty in two-year colleges are being hired straight from graduate school. This age pattern is consistent with other CBMS2000 data which show that the largest number of new hires comes from current part-time faculty at the college.

Note that in earlier CBMS reports age percentages included full-time temporary hires but neither the 1995 nor the 2000 percentages included this group. Information about gender, ethnicity, and age of new hires was not collected in surveys prior to 1995.

TABLE TYR.35 Percentage of newly appointed permanent full-time faculty in Mathematics Programs at two-year colleges coming from various sources: Fall 1995 and 2000.

	Percentage of new faculty from	
Source	1995	2000
Graduate school	30	8
Part-time or full-time temporary employment at the same college	19	34
Teaching in a four-year college or university	18	10
Teaching in another two-year college	14	19
Teaching in a secondary school	4	22
Nonacademic employment	5	6
Unemployed	9	0
Unknown	0	1
Total number hired	**100%** **350**	**100%** **572**

TABLE TYR.36 Percentage of full-time permanent faculty newly hired for Mathematics Programs at two-year colleges by highest degree: 1995–1996 and 2000–2001.

	Percentage of new hires	
Highest degree	1995–1996	2000–2001
Doctorate	19	13
Masters	80	66
Bachelors	1	19
Unknown	0	2
Total	**100%**	**100%**

TABLE TYR.37 Percentage of full-time permanent faculty newly hired for Mathematics Programs at two-year colleges by ethnic group: 1995–1996 and 2000–2001. Also percentage of women within each ethnic group: 2000–2001.

Ethnic group	Percentage of new hires		Percentage of women among 2000–2001 new hires
	1995–1996	2000–2001	
Asian/Pacific Islander	13	7	28
Black (non-Hispanic)	1	1	0
Mexican American/Puerto Rican/other Hispanic	3	5	80
White (non-Hispanic)	81	86	47
Other	2	1	7
Percentage of women among all new hires	**44%**	**42%**	--

TABLE TYR.38 Percentage of full-time permanent faculty newly hired for Mathematics Programs at two-year colleges by age: 1995–1996 and 2000–2001.

	Percentage of new hires	
Age	1995–1996	2000–2001
<30	30	11
30–34	36	21
35–39	8	37
40–44	13	5
45–49	5	6
50–54	4	12
55–59	3	6
>59	1	3
Total	**100%**	**100%**

Outflow of Full-Time Permanent Faculty

During the 1999–2000 academic year, 401 people left their full-time permanent mathematics program faculty positions at two-year colleges. Using the fall 2000 full-time permanent estimate of 6,960 as a base, this outflow was about 5.7% of the faculty. During the academic year 1994–1995, the number was an almost identical 402 people or about 5.3% of the fall 1995 full-time permanent faculty. In 1989–1990, the number leaving was 317 (4.4%) and in 1984–1985 it was 449 (7.1%). See Tables TYR.39 and TYR.17.

In 1999–2000, about 41% of the outflow left due to death or retirement, compared to 68% in 1994–1995. About 15% of those who left the two-year college mathematics faculty did so for "other reasons." By comparing Tables TYR.32 and TYR.39 for CBMS1995 and CBMS2000, one can infer that in fall 2000, in contrast to 1995, faculty remained at their institutions in larger numbers beyond age 54.

Overall, the outflow data in Table TYR.39 is less informative than the comparable data in CBMS1995 because of the large increase in the "Unknown" category. In fall 2000, this was the reason given for 23% of the outflow while in fall 1995 it was used for only 6% of the outflow.

TABLE TYR.39 Outflow of full-time permanent faculty from Mathematics Programs at two-year colleges:1999–2000.

Status	Number
Died or retired	163
Teaching in a four-year college or university	17
Teaching in another two-year college	43
Teaching in a secondary school	0
Left for a nonacademic position	14
Returned to graduate school	10
Other	60
Unknown	94
Total	**401**

Services Available to Mathematics Program Faculty

For the first time, the 1995 CBMS survey collected information on office and computer facilities available to faculty members. The 2000 survey continued to collect some of this data. Table TYR.40 gives the office facilities available to part-time faculty members in fall 2000. There was an 8 percentage point jump in the number of part-time faculty who shared a desk with two or more other people and simultaneously a 6 percentage point drop in the percentage of part-time faculty who had their own desk or shared a desk with only one other person.

TABLE TYR.40 Percentage of part-time faculty in Mathematics Programs at two-year colleges by desk availability: Fall 1995 and 2000.

	Percentage of part-time faculty	
Desk availability	1995	2000
Have their own desk	14	12
Share a desk with one other person	9	5
Share a desk with two or more other people	43	51
Have no desk	35	31

In fall 2000, essentially all full-time permanent faculty (99%) reported having a computer or terminal in their offices. In 1995, this number was 76%. Similarly, 98% of these faculty had internet access in their offices and 100% had such access somewhere on campus. See Tables TYR.41 and TYR.42.

TABLE TYR.41 Percentage of full-time permanent faculty in Mathematics Programs of two-year colleges by access to computer facilities: Fall 1995 and 2000.

	Percentage of full-time faculty	
Computer facilities	1995	2000
Computer or terminal in office	76	99
No computer or terminal in office, but shared computers or terminals nearby	21	1
No convenient access or no access at all to computers or terminals	3	0

TABLE TYR.42 Percentage of full-time permanent faculty in Mathematics Programs at two-year colleges by access to Internet: Fall 2000.

Computer facilities	Percentage of full-time permanent faculty
Internet access in office	98
Internet access at school but not in office	2

Teaching Evaluation in Two-Year College Mathematics Programs

The fall 2000 survey determined that 98% of two-year colleges periodically evaluated the teaching of full-time permanent mathematics faculty members. See survey question I–5 in Appendix V. In 1995, the figure was 100%. Similarly, according to the 2000 survey, 88% of colleges evaluated part-time faculty. Data on evaluation of part-time faculty was not collected in the 1995 survey.

The most common method of evaluating teaching was the use of evaluation forms completed by students. CBMS2000 data indicated such student evaluations were used by 90% of two-year college mathematics programs to evaluate full-time permanent faculty, down from 97% in 1995. This tool was used by 87% of schools to evaluate part-time faculty. Observation of classes by faculty or administrators, self-evaluation, and evaluation of written course materials were also common, each used by 46% to 64% of colleges. See Table TYR.43. Of interest in this table is the low percentage (50% less than for full-time faculty) of use of classroom visitations by department heads or other administrators in the evaluation of part-time faculty. A similar disparity was observed in the use of portfolios as an evaluation tool when full-time and part-time faculty are compared. Both classroom visitation and portfolios, while potentially very revealing of overall quality of teaching, are time intensive forms of evaluation which would be difficult to carry out for all part-time faculty when their numbers are large.

TABLE TYR.43 Percentage of Mathematics Programs at two-year colleges using various methods of evaluating teaching of full-time and part-time faculty: Fall 2000.

	Percentage of programs using evaluation method for	
Method of evaluating teaching	Full-time faculty	Part-time faculty
Observation of classes by other faculty	64	60
Observation of classes by division head (if different from chair) or other administrator	52	28
Evaluation forms completed by students	90	87
Evaluation of written course material such as lesson plans, syllabus, or exams	48	40
Self-evaluation such as teaching portfolios	46	24
Other methods	7	3

Professional Development Obligations and Activities of Full-Time Permanent Two-Year College Mathematics Program Faculty

In fall 2000, some form of continuing education or professional development was required of full-time permanent faculty members in 38% of two-year college mathematics programs, almost double the 1995 percentage of 20%. Table TYR.44 shows that about 36% of permanent full-time faculty fulfilled their professional development obligations by using activities provided by their home institutions. About 31% participated in activities provided by professional societies.

Direct comparison of CBMS2000 data to professional development data from CBMS1995 is not possible because of changes in the format of the two-year college questionnaire for 2000. The 1995 survey asked about participation in a wide variety of specific professional activities while the CBMS2000 questionnaire asked only about broad categories of professional development activities. Even so, some comparisons are possible. There were major changes between 1995 and 2000. For example, the 1995 survey found that a very high percentage (over 70%) of permanent full-time mathematics faculty participated in professional meetings, while CBMS2000 reported only 31% of the same faculty used professional meeting activities to fulfill their continuing education and professional development obligation. Perhaps this last figure shows that there was a major shift in the level of professional meeting participation between 1995 and 2000. Or perhaps the 31% suggests that, even though faculty continued to attend professional meetings in large numbers, colleges were not allowing them to count meeting attendance toward their professional development obligations. Only further study can explain the changes in the pattern of professional activity found in the 2000 survey.

TABLE TYR.44 Percentage of permanent full-time faculty in Mathematics Programs of two-year colleges who use various methods to fulfill their professional development obligation: Fall 2000.

Professional Development	Percentage of permanent faculty
Activities provided by employer	36
Activities provided by professional associations	31
Publishing books or research or expository papers	3
Continuing graduate education	8

Problems in Two-Year College Mathematics Programs

In every CBMS survey since 1985, 60% or more of mathematics program heads classified the need for too much student remediation as a major problem for their programs. The fall 2000 figure was 62%. See Tables TYR.45 and TYR.46. As in 1995, low student motivation ranked second among program major problems. Moving up to third place among major problems was the need to use part-time faculty in too many classes, but 38% of schools reported this was only a minor problem. Ranked fourth in the major problem list was low faculty salaries. Still in the top five of the major problem list was low success rate in remedial courses. All other major problems listed affected a much lower percentage of mathematics programs than these five. Table TYR.45 gives historical comparative data on program heads' ranking of the severity of various departmental problems.

TABLE TYR.45 Percentage of program heads classifying various problems as "major" in Mathematics Programs at two-year colleges: Fall 1985, 1990, 1995, and 2000.

	Percentage of program heads classifying problem as major			
Problem	1985	1990	1995	2000
Too many students needing remediation	60	65	63	62
Low student motivation	na	38	51	47
Low success rate in developmental/remedial courses	na	na	34	22
Faculty salaries too low	na	na	31	36
Need to use part-time faculty for too many courses	na	na	30	39
Inadequate computer facilities for student services	na	na	23	3
Inadequate computer facilities for faculty use	27	7	22	2
Inadequate travel funds for faculty	41	26	21	15
Inadequate departmental support services (secretary, etc.)	41	26	15	5
Low success rate in transfer-level courses	na	na	15	8
Inadequate classroom space	21	18	14	17
Class sizes too large	27	10	11	10
Maintaining vitality of faculty	39	22	11	9
Staffing computer science courses	34	8	8	18
Coordinating mathematics courses with high schools	19	9	8	6
Too few students who intend to transfer actually do	na	na	7	2
Lack of curricular flexibility because of transfer rules	na	10	6	1
Staffing statistics courses	na	na	4	2
Dual-enrollment courses	na	na	na	8
Commercial outsourcing of instruction	na	na	na	1
Use of distance education	na	na	na	10

TABLE TYR.46 Percentage of program heads of Mathematics Programs at two-year colleges classifying various problems by severity: Fall 2000.

	Percentage of program heads classifying problems as		
Problem	minor or no problem	somewhat of a problem	major problem
Too many students needing remediation	7	30	62
Low student motivation	17	37	47
Low success rate in developmental/remedial courses	31	47	22
Faculty salaries too low	27	36	36
Need to use part-time faculty for too many courses	38	23	39
Inadequate computer facilities for student services	76	21	3
Inadequate computer facilities for faculty use	90	7	2
Inadequate travel funds for faculty	59	26	15
Inadequate departmental support services (secretary, etc.)	78	17	5
Low success rate in transfer-level courses	63	30	8
Inadequate classroom space	51	32	17
Class sizes too large	65	25	10
Maintaining vitality of faculty	72	18	9
Staffing computer science courses	72	9	18
Coordinating mathematics courses with high schools	72	22	6
Too few students who intend to transfer actually do	88	11	2
Lack of curricular flexibility because of transfer requirements	85	14	1
Staffing statistics courses	81	17	2
Dual enrollment credit (HS & college) courses	77	14	8
Commercial outsourcing of instruction	98	1	1
Use of distance education	82	8	10

Administration of Mathematics Programs in Two-Year Colleges

As was the case with four-year schools, two-year colleges made a major shift to the semester system between 1995 and 2000. In fall 2000, 93% of two-year colleges operated under the semester system, up from 73% in 1995. See Table TYR.47. For comparative data on four-year colleges, see Table SE.2 in Chapter 1.

In fall 2000, as in 1995, about 43% of two-year college mathematics programs were administered as departments, with 10% of these being multi-campus departmental systems. A division structure, where mathematics is combined with science or other disciplines, was found in just over half of two-year colleges. See Table TYR.48. In future surveys it would be instructive to probe the positive or negative effects on mathematics instruction of the various structures used to administer mathematics programs at two-year colleges.

Historically, mathematics courses at two-year colleges have been taught in many different administrative units other than in the mathematics programs. This practice continued in fall 2000, as shown in Table TYR.16. In fall 2000, about 29% of all two-year colleges administered their remedial or developmental mathematics courses separately from the mathematics program. That percentage is essentially the same as the 30% figure found in 1995.

TABLE TYR.47 Percentage of Mathematics Programs at two-year colleges by type of academic calendar: Fall 1995 and 2000.

	Percentage	
Academic calendar	1995	2000
Semester	73	93
Trimester	0	0
Quarter	26	6
Other or unknown	1	1

Note: 0 means less than half of 1%.

TABLE TYR.48 Percentage of Mathematics Programs at two-year colleges by type of administrative structure: Fall 2000.

Administrative structure	On their own campus	As part of a multicampus organization
Mathematics department	33	10
Mathematics and computer science department	4	0
Mathematics and science department or division	34	2
Other department or division structure	14	1
None of the above or unknown	2	

Topics of Special Interest For Two-Year Mathematics Programs

In each CBMS survey cycle certain topics of special interest are chosen for data collection and comprehensive analysis across both two-year and four-year schools. In fall 2000, five such topics were chosen. They are discussed in Chapter 2 of the current report. Two of them, pre-service education of K–8 teachers and faculty who teach dual enrollment courses, are relevant to this chapter. Topics of special interest dealing with the placement testing of students in two-year college mathematics programs and with distance learning in mathematics are discussed in Chapter 6.

Pre-Service Mathematics Education of K–8 Teachers

Although they did not offer teacher certification credentials, two-year colleges in fall 2000 were involved in the pre-service education of teachers. Anecdotal evidence suggested this involvement grew as more students turned to two-year colleges, especially in summer sessions, to take required mathematics courses. Estimated enrollment of such students in fall 2000 was about 18,000. See course enrollment data in Table TYR.3 in Chapter 6.

About half of all two-year colleges offered a special course for pre-service K–8 teachers in either academic year 1999–2000 or 2000–2001. See Tables TYR.5 and TYR.6 in Chapter 6. Fewer than a quarter assigned a faculty member to coordinate pre-service K–8 teacher education. The extent to which pre-service elementary school teachers use two-year college mathematics courses to fulfill certification requirements deserves further study. If the anecdotal evidence is accurate, more cooperation and better coordination in this area between two-year colleges and certifying institutions become increasingly important. Pre-service teacher education is discussed in detail in Chapter 2. With regards to two-year colleges, see Table PSE.3.

Faculty who Teach Dual Credit Courses

Dual enrollment is a credit structure that allows high school students to receive simultaneous high school and college credit for courses which most often are taught at the high school by high school teachers. Data in Chapter 2 (Tables DEN.16 through 18) and Chapter 6 show how large the dual credit system had become by fall 2000 when about 14% of all two-year college sections of College Algebra, Precalculus, and Calculus were dual enrollment courses.

In fall 2000, a faculty member teaching a dual enrollment course was viewed by most respondents as a part-time faculty member at the two-year college which awarded college credit for the course, even though the salary was paid completely by a third party, e.g., the local school district. CBMS2000 investigated the extent to which two-year college mathematics programs retained control of various aspects of dual enrollment courses.

In only 61% of cases did the two-year college mathematics program have full control over the selection of instructors for dual credit courses. In 79% of cases, the textbook used by a dual credit instructor was chosen by the two-year college mathematics program. However, only 57% of two-year college mathematics programs reported controlling the final examinations in their dual credit courses. Two-year college mathematics programs reported that in nine out of ten cases their dual enrollment instructors were required to meet the same degree requirements as other part-time faculty members. In only two-thirds of dual enrollment courses was teaching evaluated in the same way it was evaluated in courses taught by other part-time mathematics faculty.

In spite of the issues raised in the preceding paragraph, in Table TYR.46 among all survey respondents (who include respondents from schools which do not have dual enrollment arrangements) only 8% of mathematics program heads in two-year colleges saw dual enrollment courses as a major problem. Another 14% found dual enrollment arrangements somewhat of a problem. However, analysis of only those responses which came from schools reporting that they actually had a functioning dual enrollment program showed that more than 13% said dual enrollment was a major problem and an additional 14% said it was a moderate problem. Nonetheless, even in this group of actual users of dual enrollment, about 72% said dual enrollment was only a minor problem or no problem.

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Appendix I

Enrollment in Department Courses in Four-Year Colleges and Universities: Fall 1980, 1985, 1990, 1995, 2000

TABLE A.1 Enrollment (in 1000s) in Mathematics Courses: Fall 1980, 1985, 1990, 1995, and 2000. Roundoff may cause marginal totals to appear incorrect.

						Fall 2000 Enrollment (in 1000s)						
						Mathematics Departments				Statistics Departments		
Courses	1980	1985	1990	1995	2000	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal Math Depts	Univ (PhD)	Univ (MA)	Subtotal Stat Depts
Remedial												
1 Arithmetic	14	15	6	7	10	1	3	6	10			
2 Genl Math (Basic Skills)	49	31	17	13	13	3	5	5	13			
3 High School Elem Algebra	74	75	68	56	70	14	15	40	70			
4 High School Intermed Alg	104	130	170	131	117	39	34	44	117			
5 Other remedial level	(na)	(na)	(na)	15	8	1	2	6	8			
Subtotal Remedial Level	**241**	**251**	**261**	**222**	**218**	**58**	**59**	**101**	**218**			
Introductory (incl. pre-Calc)												
6 Coll Algebra	160	150	202	195	211	78	74	58	211			
7 Trigonometry	38	37	37	42	33	16	9	7	33			
8 Coll Alg & Trig combined	61	78	35	45	37	18	8	12	37			
9 Elem Fnctns[1]	80	77	78	86	105	39	28	38	105			
10 Intro Math Modeling	(na)	(na)	(na)	(na)	13	4	3	6	14			
11 Math Lib Arts	63	59	53	74	86	18	31	37	86			
12 Finite Math	95	88	80	59	82	41	17	24	82			
13 Business Math	48	37	37	40	53	19	24	10	53			
14 Math Elem Sch Tchrs	44	54	62	59	68	15	23	29	68			
15 Other Intro level math	14	13	8	14	36	12	9	15	36			
Subtotal Intro Level	**603**	**593**	**592**	**614**	**723**	**260**	**226**	**236**	**723**			

[1] Elementary Functions, Precalculus, and Analytic Geometry.

TABLE A.1, Cont. Fall Term Mathematics Course Enrollment (in 1000s).

						Fall 2000 Enrollments (in 1000s)						
						Mathematics Departments				Statistics Departments		
Courses	1980	1985	1990	1995	2000	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal Math Depts	Univ (PhD)	Univ (MA)	Subtotal Stat Depts
Calculus Level												
16 Mainstream Calc I	*a*	*b*	201	192	192	89	43	60	192			
17 Mainstream Calc II	*a*	*b*	88	83	87	48	17	22	87			
18 Mainstream Calc III,IV	*a*	*b*	84	62	73	45	13	15	73			
19 Non-mainstrm Calc I	*c*	*d*	148	98	105	56	32	17	105			
20 Non-mainstrm Calc II	*c*	*d*	15	14	10	8	2	0	10			
21 Differential Equations	44	45	41	33	34	22	7	5	34			
22 Discrete Math	(na)	14	17	16	20	8	7	6	20			
23 Linear/Matrix Algebra	37	47	44	33	41	24	7	10	41			
24 Other Calculus level	(na)	(na)	10	9	7	4	2	1	7			
Subtotal Calculus Level	**590**	**637**	**648**	**539**	**570**	**302**	**131**	**137**	**570**			
Advanced Level												
25 Intro to Proofs	(na)	(na)	5	7	10	3	2	5	10			
26 Mod Alg I & II	10	13	12	13	11	3	2	6	11			
27 Nmbr Theory	1	3	4	2	4	1	1	2	4			
28 Combinatorics	1	4	3	2	3	2	0	0	3			

Note: 0 means less than 500 enrollments.
a The total enrollment in all mainstream calculus I,II,III,IV in Fall 1980 was 405,000,
b The total enrollment in all mainstream calculus I,II,III,IV in Fall 1985 was 402,000.
c The total enrollment in all non-mainstream calculus I and II in Fall 1980 was 104,000.
d The total enrollment in all non-mainstream calculus I and II in Fall 1985 was 129,000.

TABLE A.1, Cont. Fall Term Mathematics Course Enrollment (in 1000s).

						Fall 2000 Enrollments (1000s)						
						Mathematics Departments				Statistics Departments		
Courses	1980	1985	1990	1995	2000	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal Math Depts	Univ (PhD)	Univ (MA)	Subtotal Stat Depts
29 Actuarial Math	(na)	(na)	2	1	1	1	0	0	1			
30 Logic/ Foundations	4	6	2	3	2	1	1	1	2			
31 Discrete Structures	(na)	7	3	3	5	2	1	3	5			
32 Hist of Math	2	2	2	3	2	1	1	1	2			
33 Geometry	4	7	8	6	6	2	2	2	6			
34 Math for HS Teachers	1	5	4	5	7	2	3	2	7			
35 Adv Calc I, II, & Real Analysis	15	19	16	11	10	5	2	3	10			
36 Adv Math for Engr & Physics	14	10	10	8	5	3	1	1	5			
37 Adv Lin Alg	*e*	*f*	*g*	4	3	2	0	0	3			
38 Vector Analysis	*e*	*f*	*g*	3	2	1	1	0	2			
39 Adv Diff Eqns	1	4	2	3	2	2	0	1	2			
40 Partl Diff Eqns	2	5	2	1	2	1	1	1	2			
41 Num, Analysis	10	13	8	6	5	2	1	1	5			
42 Appl Math (Math Modeling)	2	4	2	4	2	1	0	0	2			
43 Complex Var	3	5	4	2	3	1	1	1	3			
44 Topology	1	2	1	1	2	1	0	1	2			
45 Senior Sem/Ind Study in Math	4	2	2	3	3	1	0	2	3			
46 Other Adv Level Courses	6	7	11	5	10	6	2	2	10			

Note: 0 means less than 500 enrollments.
e Combined Fall 1980 enrollment in Advanced Linear Algebra and Vector Analysis was 8,000.
f Combined Fall 1985 enrollment in Advanced Linear Algebra and Vector Analysis was 14,000.
g Combined Fall 1990 enrollment in Adv. Linear Algebra and Vector Analysis was 9,000.

TABLE A.1, Cont. Fall Term Mathematics Course Enrollment (in 1000s).

						Fall 2000 Enrollments (1000s)						
						Mathematics Departments				Statistics Departments		
Courses	1980	1985	1990	1995	2000	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal Math Depts	Univ (PhD)	Univ (MA)	Subtotal Stat Depts
Operations Research												
58 Intro Oper Res	*h*	*i*	4	1	1	0	1	0	1			
59 Int to Linear Programming	*h*	*i*	3	1	1	0	0	0	1			
60 Other Oper Research	*h*	*i*	1	0	0	0	0	0	0			
Subtotal Advanced Math	**91**	**138**	**120**	**96**	**102**	**43**	**24**	**35**	**102**			
Mathematics Total	**1525**	**1619**	**1621**	**1471**	**1614**	**663**	**440**	**509**	**1614**			

Note: 0 means less than 500 enrollments.
h Combined Fall 1980 enrollment in all Operations Research courses was 2,000.
i Combined Fall 1985 enrollment in all Operations Research courses was 6,000.

TABLE A.2 Enrollment (in 1000s) in Statistics Courses: Fall 1980, 1985, 1990, 1995, 2000 in Mathematics Departments and Statistics Departments. Roundoff may cause marginal totals to appear incorrect.

						Fall 2000 Enrollment (in 1000s)						
						Mathematics Departments				Statistics Departments		
Statistics Courses	1980	1985	1990	1995	2000	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal Math Depts	Univ (PhD)	Univ (MA)	Subtotal Stat Depts
Elem. Level												
1 Elem Stat. (no Calc prereq)	87	115	84	132	155	29	31	54	115	35	5	40
2 Prob.&Stat (no Calc. prereq)	17	29	33	26	17	3	2	8	13	3	1	4
3 Other elem level stat	(na)	(na)	(na)	6	17	6	1	0	8	7	2	9
Subtotal: Elem Level Stat	**104**	**144**	**117**	**164**	**190**	**38**	**35**	**62**	**136**	**46**	**8**	**54**
Upper Level												
4.Math Stat (Calc Prereq)	16	24	17	16	18	4	5	4	13	3	1	5
5 Probability (Calc Prereq)	13	15	13	10	17	4	5	4	13	3	0	4
6 Stochastic Processes	(na)	0	1	0	1	0	0	0	0	0	0	0
7 Appl Stat Analysis	8	11	10	9	6	2	1	1	3	3	0	3
8 Design & Anal of Exper	2	1	1	1	2	0	0	1	1	0	0	0
9 Regressn & Correlation	1	1	2	1	2	0	0	0	1	1	0	1
10 Biostatistics	(na)	(na)	(na)	(na)	2	0	0	0	1	1	0	1
11 Nonparamet Statistics	(na)	(na)	(na)	(na)	1	0	0	0	0	0	0	0
12 Categorical Data Anal	(na)	(na)	(na)	(na)	0	0	0	0	0	0	0	0

Note: 0 means less than 500 enrollments.

TABLE A.2, Cont. Fall Term Statistics Course Enrollment (in 1000s).

						Fall 2000 Enrollments (in 1000s)						
						Mathematics Departments				Statistics Departments		
Statistics Courses	1980	1985	1990	1995	2000	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal Math Depts	Univ (PhD)	Univ (MA)	Subtotal Stat Depts
13 Survey Design & Anal	(na)	(na)	(na)	(na)	0	0	0	0	0	0	0	0
14 Stat Sftwre & Computing	(na)	(na)	(na)	(na)	1	0	0	0	0	1	0	1
15 Data Mgmt	(na)	(na)	(na)	(na)	0	0	0	0	0	0	0	0
16 Sen Sem/ Indep Stdy in Stat	0	0	0	0	0	0	0	0	0	0	0	0
17 Other Upper Level Stat	3	1	8	7	5	0	1	0	2	3	1	4
Subtotal Upper Level Stat	**43**	**63**	**52**	**44**	**45**	**12**	**12**	**11**	**35**	**17**	**3**	**20**
Statistics Total	**147**	**207**	**169**	**208**	**235**	**50**	**47**	**74**	**171**	**63**	**11**	**74**

Note: 0 means enrollments less than 500 enrollments.

TABLE A.3 Enrollment (in 1000s) in Computer Science Courses: Fall 1980, 1985, 1990, 1995, 2000*. Roundoff may cause marginal totals to appear incorrect.

						Fall 2000 Enrollments (in 1000s)						
						Mathematics Departments				Statistics Departments		
CS Courses	1980	1985	1990	1995	2000	Univ (PhD)	Univ (MA)	Coll (BA)	Subtotal Math Depts	Univ (PhD)	Univ (MA)	Subtotal Stat Depts
Lower Level												
61 Computers & Society	(na)	69	34	14	4	0	1	3	4			
62 Intro. to Software Pkgs	(na)	(na)	28	18	25	0	10	15	25			
63 Issues in CS	(na)	(na)	1	6	6	0	1	6	6			
64 Cmptr Prog I **	154	129	33	17	23	2	7	15	23			
65 Cmptr Prog II **	32	28	8	5	6	1	3	3	6			
66 Adv Prog & Data Str	(na)	15	5	4	4	0	2	2	4			
67 Database Mgmt Systems	(na)	7	3	2	1	0	0	1	1			
68 Discrete Str for CS	(na)	12	3	2	4	1	1	2	4			
69 Other Lower Level CS Courses	[na]	90	19	7	16	0	10	6	16			
Subtotal Lower Level CS	186*	350*	134*	75*	90*	5	35	52	90*			
Middle Level												
70 Intro. to Computer Systems	16	18	2	6	4	0	1	2	4			
71 Assembly Lang Programing	(na)	24	6	2	1	0	0	1	1			
72 Intro to Cmptr Organization	12	14	2	1	3	0	1	2	3			
73 Intro to File Processing	7	10	2	0	1	0	0	1	1			
74 Other Mid-Level CS	(na)	(na)	(na)	4	9	1	4	4	9			
Subtotal Middle Level CS	**35**	**66**	**12**	**13**	**18**	**1**	**7**	**9**	**17**			
All Upper Level CS Courses	**100***	**142***	**34***	**12***	**17***	**2**	**6**	**8**	**16**			
Total Computer Science	**321***	**558***	**180***	**100***	**123***	**8**	**46**	**69**	**123**			

* For 1980 and 1985, these figures include CS enrollments in both Mathematics and in separate CS Departments. Starting in 1990, enrollments are from Mathematics Departments only.

** Refers to courses described in the report of the ACM/IEEE-CS report, ACM 1991.

Appendix II
Sampling and Estimation Procedures

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Overview

This report is divided into the following two sections: *Sampling Approach* and *Survey Design*. In sum, a stratified, simple random sample was employed in the CBMS 2000 survey and strata were based on two key variables: total institutional enrollment and highest degree level offered. Additionally, a paper-and-pencil data collection method was implemented between the months of September 2000 and February 2001 and all resulting estimates were generated in a SAS-Callable version of SUDAAN using a stratified sampling without replacement design.

Sampling Approach

A stratified, simple random sample of 600 two-year and four-year colleges and universities was employed in CBMS 2000. This involved drawing three independent samples of the four-year mathematics, four-year statistics, and two-year mathematics programs. Target sample sizes of responding programs were determined for these groups based on established variance requirements for estimates associated with two key outcome variables—total institutional enrollment and highest degree level offered (i.e., BA, MA, PhD). Finally, a compromise mix of statistically optimum Neyman allocations for the two key outcome variables was used to determine targeted program sample sizes for the 24 sampling strata that were formed within these three groups.

Target Population and Sampling Frames

The target population of the CBMS 2000 survey consisted of undergraduate mathematics and statistics programs at two-year and four-year colleges and universities in the United States. In most cases, these programs were established academic departments while others were simply fledgling departments or other types of curriculum concentrations. A total of 2,507 programs were identified as being eligible for participation in the survey. Sample selection was made from three separate frames. The first frame consisted of 1,430 mathematics programs at four-year colleges and universities. The second frame consisted of 70 statistics programs at four-year colleges and universities. The third frame consisted of 1,007 mathematics programs at two-year colleges.

Selection of Stratification Variables

Prior to selecting the sample for the CBMS 2000 survey, the stratification variables used in the CBMS survey conducted in 1995 were examined to determine their significance in predicting specific key outcome variables in each of the programs surveyed and thus their utility for stratification in CBMS 2000. This was done because the utility of a variable for stratification in generating estimates from a stratified sample depends on its statistical correlation with important measurements made on the sample.

Stratification in the CBMS 1995 survey was accomplished as follows: Four-year college and university mathematics and statistics departments were separately divided into 20 strata based on **Control** (whether the college or university was publicly or privately funded), **Level** (the highest degree level offered—BA, MA or PhD), and **Enrollment** (total institutional enrollment for Fall 2000). Thus, the stratification used for the 1995 estimates were defined by **Curriculum** (mathematics or statistics program), **Control**, **Level**, and **Enrollment**.

Our analysis of the CBMS 1995 data showed that **Curriculum**, **Level** and **Enrollment** would be the best stratification variables for producing estimates of the CBMS 2000 target population and these key variables were used across four-year mathematics, four-year statistics, and two-year mathematics programs.[1] Table A2.1 displays the overall stratum breakdown (24 strata total) for each of the three frames. The four-year mathematics department frame was divided into 12 strata, the four-year statistics department frame was divided into five strata, and the two-year programs were divided into seven strata.

The final stratum designations for the CBMS 2000 survey (also indicated in Table A2.1) very closely follow the stratum designations that were made for the CBMS 1995 survey. The major difference in stratum designations for the CBMS 2000 survey resulted from the

[1] Level is not applicable in the two-year frame.

TABLE A2.1 Stratum Designations and Final Agreed Allocations for the CBMS 2000 Study.

Stratum	Curriculum	Level	Enrollment	Final Agreed Allocation	Sampling Rate
1	Four-Year Math	PhD	0–14,999	24	0.3158
2			15,000–24,999	23	0.3594
3			25,000–34,999	15	0.4688
4			35,000+	12	0.8000
5		MA	0–6,999	12	0.1250
6			7,000–14,999	27	0.2727
7			15,000+	14	0.3684
8		BA	0–999	18	0.0845
9			1,000–1,499	10	0.0556
10			1,500–2,499	13	0.0518
11			2,500–4,999	28	0.1290
12			5,000+	44	0.2953
13	Four-Year Statistics	PhD	0–14,999	7	0.5833
14			15,000–24,999	18	0.8571
15			25,000–34,999	11	0.9167
16			35,000+	11	0.9167
17		MA/BA	All	13	1.0000
18	Two-Year Schools	N/A	0–999	5	0.0342
19			1,000–1,999	34	0.2086
20			2,000–3,999	43	0.1536
21			4,000–7,999	92	0.4220
22			8,000–14,999	72	0.5373
23			15,000–19,999	23	0.6765
24			20,000+	31	0.9688
	Total Allocation			600 programs	

decision to not stratify by each program's public or private classification, as only minimal strength in predicting key outcome variables was seen by using **Control** as a stratification variable. In addition to describing the sample strata, Table A2.1 lists final agreed allocation and the sampling rate of the 600 selected programs for the CBMS 2000 survey.

Sample Selection

Programs on each of the three sample frames were individually assigned a computer generated random number. The frames were then sorted in ascending order by stratum and by the random number assigned. Next, the final agreed allocation of programs was selected from each stratum. As an illustrative example, Stratum 1 required 24 programs to be selected. After the four-year mathematics frame was sorted in ascending order by stratum number, random numbers were assigned to each program in this stratum, and programs within stratum were sorted by the random number. The first 24 programs on the sorted list were selected for the sample, and the rest were excluded. This process was repeated in each of the remaining strata. The final selected sample was then sent to the CBMS 2000 study director, who attached current contact information for each of the programs on the files. The files were then sent back to the SRU to begin the data collection process.

A few additional steps were required after the sample selection of the two-year programs took place. This was due to the existence of programs in multi-campus college systems that were listed on the sample frame. A multi-campus college system was defined as a program with more than one campus in its system and eligible for participation in the survey. Two types of problems affecting the sample can arise. One arises from an overrepresentation of programs in multi-campus systems in the two-year sample if more than one of its campuses is listed on the frame. Consequently, a multi-campus system would have a greater chance of being selected for participation compared to a program having only a single entry on the frame. Without controlling for the possibility of multi-campus systems on the two-year frame, it is conceivable that one or more campuses within a multi-campus system could be present in the final study sample. This problem can be remedied by eliminating multiple system listings before choosing the sample, or by adjusting the program's weight to account for its multiplicity.

The other multi-campus system problem occurs when the system is only listed once, but no one at the system level is able to complete the questionnaire for the entire system. Since this problem occurred several times in the two-year sample for CBMS 2000, a solution was needed. Our approach was to invite the program in one randomly selected campus of the system to become the study respondent. This involved first sending the two-year sample to the director of the project, who identified the programs on the list with a single entry on the frame that were to be classified as multi-campus college systems. Thirty-six institutions were identified as being organized into two or more campuses. The 36 programs were contacted by CBMS staff to determine the manner in which the institution would prefer to complete the questionnaire. Of the 36 multi-campus institutions, 12 offered to complete the questionnaire for the entire program system (i.e., all eligible campuses). The remaining 24 multi-campus institutions needed to be sampled to select one campus from each to receive the questionnaire. Sub-sampling campuses in this way altered selection probabilities, which in turn affected the computation of sampling weights.

Sample selection occurred in the same manner as detailed previously. The 87 (total) campuses within the 24 multi-campus systems were individually assigned a computer generated random number. The campuses were then sorted in ascending order by the institution identifier and by the random number assigned. Next, the final agreed allocation of programs was selected from each stratum. Because one campus was to be selected from each school, the first campus for each school was selected for the sample (after sorting in ascending order by the assigned random number), and the rest were discarded. The sample was then sent to the CBMS 2000 study director, who attached current contact information for each of the campuses selected. The files were then sent back to the SRU to continue the data collection process and the program sample weights appropriately modified.

The final selection probability for all selected programs in multi-campus college systems took the total number of eligible campuses into consideration; that is, for the i^{th} such program,

$$\prod_{\mathbf{i}} = \mathbf{f_i} * \mathbf{1/k_i} \;,$$

where

$\mathbf{f_i}$ = the program sampling rate for the stratum in which the multi-campus system was selected;

$\mathbf{k_i}$ = total number of eligible campuses in the system.

For all other programs, the program selection probability was simply $\prod_{\mathbf{i}} = \mathbf{f_i}$.

Raw Program Weight = 1/$\prod_{\mathbf{i}}$,

where

$\prod_{\mathbf{i}}$ = selection probability of the chosen campus in a multi-campus college system.

Survey Design

This section highlights changes in the 2000 instruments, describes the data collection and analysis procedures, demonstrates how the final weights were calculated, and examines some potential measurement problems that were encountered and how we dealt with them.

Questionnaire Development

The CBMS 1995 instruments were reviewed by the SRU for over a three-month period and major changes were implemented. The most significant recommendations and changes will be highlighted here.

A general recommendation made and adopted in the CBMS 2000 instruments was to improve user-friendliness as well as to construct features that would aid in the data entry process. User-friendliness was enhanced by binding the instruments in booklet form, increasing the font in hard-to-read places, and clarifying and condensing the instructions. Data entry features were enhanced simply by sequentially numbering each question as well as each response option. Requests were made to reduce respondent burden and shorten the instruments (especially the two-year instrument), but given the short workup period no action was subsequently taken. The three instruments used in the study were entitled the Four-Year Mathematics Questionnaire, the Statistics Questionnaire, and the Two-Year Questionnaire.

Survey Implementation

Data collection occurred over a seven-month period. An advance letter was sent out to all respondents on September 1, 2000 informing them that they were selected to participate and that they would receive the CBMS 2000 questionnaire within the next couple of weeks. All questionnaires were mailed out on September 11, 2000 and a postcard was sent out on October 9, 2000 to either remind participants to respond or to thank them for their participation. A second batch of questionnaires was mailed out to all nonrespondents on October 23, 2000. The names and telephone numbers of all nonrespondents were sent to the director of the project on November 30, 2000 and were to be followed up by an appointed committee. Questionnaires were accepted until February 28, 2001.

Data Analysis

SUDAAN is a statistical package of choice when analyzing data from complex sample surveys. The advantage here is that it allows the user to compute not only estimates such as totals and ratios, but also to generate the standard errors of those estimates in accordance with the sample design. Many statistical packages will compute population estimates without much trouble, but the standard errors are based on simple random sampling; thus they produce standard errors that are inappropriate for complex designs. SUDAAN uses first-order Taylor approximation procedures in generating the standard errors, which is much more sensitive or accurate. The sample design used in this study and incorporated into SUDAAN was stratified sampling without replacement (STRWOR).

TABLE A2.2 Nonresponse Adjusted Sample Weights Used in the Four-Year Mathematics Questionnaire.

Stratum	N_h	n_h	Number of completes	Ineligible	Response rate	Program level raw weight	Program level adjusted weight
1	76	24	21	0	0.875	3.167	3.619
2	64	23	19	0	0.826	2.783	3.368
3	32	15	11	1	0.786	2.133	2.715
4	15	12	11	0	0.917	1.250	1.364
5	96	12	7	0	0.583	8.000	13.714
6	99	27	17	0	0.629	3.667	5.823
7	38	14	9	0	0.643	2.714	4.222
8	213	18	9	0	0.500	11.833	23.667
9	180	10	7	0	0.700	18.000	25.714
10	251	13	8	0	0.615	19.308	31.375
11	217	28	18	0	0.643	7.750	12.056
12	149	44	31	0	0.704	3.386	4.806
Total	**1430**	**240**	**168**	**1**	**0.700**	**5.958**	**8.512**

TABLE A2.3 Nonresponse Adjusted Sample Weights Used in the Statistics Questionnaire.

Stratum	N_h	n_h	Number of completes	Ineligible	Response rate	Program level raw weight	Program level adjusted weight
13	12	7	6	0	0.833	1.714	2.057
14	21	18	14	1	0.833	1.167	1.400
15	12	11	6	0	0.545	1.091	2.000
16	12	11	11	0	1.000	1.091	1.091
17	13	13	8	1	0.667	1.000	1.500
Total	**70**	**60**	**45**	**2**	**0.776**	**1.212**	**1.610**

For quality control purposes, all questionnaires were doubly entered by data entry personnel at the SRU and most discrepancies between the two files were settled by locating the original document. In a few cases, however, the respondents had to be contacted to clarify the discrepancy. The data cleaning process ended in April 2001 and the bulk of data analysis occurred between the months of May and August of 2001.

Sample Weights and Response Rates

For any respondent in the **h**th stratum, the nonresponse adjusted sample weight was computed as follows:

- **Raw Weight = N_h / n_h**
- **Response Rate (RR) = m_h (n_h – i_h)**

where,

N_h = the total number of programs in the **h**th stratum

n_h = the number of programs in the selected **h**th stratum

m_h = the number of (eligible) responding programs in the **h**th stratum

i_h = the number of ineligible sample programs in the **h**th stratum.

- **Adjusted weight = Raw Weight * (1/RR)**

See Tables A2.2, A2.3, and A2.4 for the weights used in the Four-Year Math, Statistics, and Two-Year samples, respectively. In addition, a question about typical teaching assignments was inadvertently left out of the two-year college questionnaire, and the survey directors were forced to e-mail each responding program asking for additional information about teaching assignments. This question required separate weights and those values appear in Table A2.5.

TABLE A2.4 Nonresponse Adjusted Sample Weights Used in theTwo-Year Mathematics Questionnaire.

Stratum	N_h	n_h	Number of completes	Ineligible	Response rate	Program level raw weight	Program level adjusted weight
18	146	5	3	0	0.600	29.200	48.667
19	163	34	14	0	0.412	4.794	11.643
20	280	43	29	0	0.674	6.512	9.655
21	218	92	50	0	0.543	2.369	4.360
22	134	72	47	0	0.653	1.861	2.851
23	34	23	16	0	0.696	1.478	2.125
24	32	31	20	0	0.645	1.032	1.600
Total	**1007**	**300**	**179**	**0**	**0.603**	**6.749**	**80.901**

TABLE A2.5 Nonresponse Adjusted Sample Weights Used in theTwo-Year Mathematics Questionnaire for Post-hoc Question.

Stratum	N_h	n_h	Number of completes	Ineligible	Response rate	Program level raw weight	Program level adjusted weight
18	146	5	2	0	0.359	29.200	81.343
19	163	34	12	0	0.359	4.794	13.355
20	280	43	25	0	0.582	6.512	11.200
21	218	92	44	0	0.478	2.370	4.955
22	134	72	41	0	0.569	1.861	3.268
23	34	23	15	0	0.652	1.479	2.267
24	32	31	19	0	0.613	1.032	1.685
Total	**1007**	**300**	**158**	**0**	**0.516**	**6.750**	**118.071**

Analysis Plan

To expedite analysis, protocols were developed in advance. Each protocol identified the variables involved, any mathematical transformations, the type of parameter being estimated, the procedure used to estimate the parameter, the units in which the estimate was to be reported, and any domain variables used to compartmentalize the variables. All protocols were subject to review by the project director and approved before any estimates were generated. Table A2.6 is an example of the protocol used to construct Table FY.1 on page 72 of the CBMS 1995 report. All variables and any resulting manipulations were spelled out in this fashion in an attempt to leave no room for ambiguity.

Manipulation Checks

Because of the complex nature of the questionnaire, several manipulation checks were performed on the data before analyses proceeded. Data were listed on the questionnaires in the following progression: (1) total fall enrollment; (2) total number of sections; (3) number of sections taught by distance learning; (4) result when subtracting the number of sections taught by distance learning from total number of sections; (5) number of sections taught by tenure or tenure-eligible faculty (minus distance learning); (6) number of sections taught by other full-time faculty (minus distance learning); (7) number of sections taught by part-time faculty (minus distance learning); and (8) number of sections taught by graduate teaching assistants (minus distance learning). Items were flagged if the following discrepancies occurred: **(2) thru (8) >(1); (3) thru (8) > (2); (4) thru (8) > (3); (5) thru (8) > (4)**. If the discrepancy could not be settled by reviewing the questionnaire, the respondent was called to settle it. No imputations were made for missing data. In fact, blank boxes in the questionnaires had to be viewed as indicating zero, because many respondents refused to fill in all the boxes. Hence, it was impossible to tell the difference between missing values and zeros.

To produce estimates, such as the ones generated from Table A2.6, a unit conversion was performed. Estimates, such as the percentage of enrollment in large lecture sections of Mainstream Calculus I that were taught by tenured and tenure eligible faculty, were based on the following form:

$$\frac{B16\_15 * (B16\_12 \div B16\_13)}{B16\_12},$$

where

B16_15 = Number of Mainstream Calculus I with large lecture and recitation sections taught by tenured or tenure-eligible faculty;

B16_12 = Total Enrollment in Mainstream Calculus I with large lecture and recitation; and

B16_13 = Total Number of Sections in Mainstream Calculus with large lecture and recitation.

One of the challenges we faced in analyzing the data from CBMS 2000 was the need for estimation in different units than the respondents reported. For example, we were asked to estimate numbers of *students* taking certain types of classes when respondent reported numbers of *sections* for these classes. Although (to obtain the point estimates) we were able to make the conversion to number of students by strategically calculating average student enrollment in sections and multiplying these averages by the counts of sections, we were unable to produce estimate acceptable variances corresponding to those point estimates. The reason is that variance estimation in the survey analysis software package we used (SUDAAN 7.5.6) is based on the so-called Taylor Series Linearization approach, which does not readily handle units conversions like this very well, particularly when the vehicle to accomplish the conversion (average section enrollment here) is an estimate which is subject to sampling error in and of itself. The variance estimates that were subject to uncertain reliability were noted in the analysis protocol (as seen in Table A2.6). Considering the implications of the two alternative solutions that one might consider in working around this issue in the future (i.e., reporting findings in sections, or asking respondents to report in number of students), it seems that reporting findings with sections as the unit might be the least painful, given the burden already faced in the current questionnaire.

A final problem that was noted in the protocol, but could not be corrected for statistically, was the fact that some total estimates did not sum to 100. The wildcard seems to be the distance learning sections, which are included in the determination of average section sizes, but are left out when producing estimates for various courses. As distance learning becomes more of a factor in math programs, some decision will have to be made regarding their handling and treatment in future CBMS reports.

Generation of Information Products

All analyses were generated using the SAS-Callable version of SUDAAN. To ease interpretation, the SUDAAN output was exported to Excel spreadsheets and sent to the CBMS director where he transferred the estimates into the table shells for production. See Table A.2.7 for an example of the SUDAAN output which refers to the percentage of large lecture enrollments in Mainstream Calculus I as taught by tenured and tenure-eligible faculty in departments of mathematics by school type (or highest degree offered—HDO). All estimates were produced in this fashion.

TABLE A2.6 Example of Analysis Protocol: Table FY.1 (page 72).

KEY: 4=4-Yr Math, 2=2-Yr Math, S=Stat, N=New

95 REF (Row 1)	Key	Variables involved	Description	Analysis: Numerator	Analysis: Denominator	Parameter type	SUDAAN PROC[1]	Unit	Domain variable
76/100/0	4	B16_15	No. of large sections TEN/TE faculty						
	4	B16_13	Total # of large sections						
	4	B16_12	Total Enrollment in B16_1						
	N	ASSB16_	Average section size in B16_1	B16_12	B16_13				
	N	T_B16_15	Total # of students taught by TEN/TE faculty	(B16_15*ASSB16_1)					
	N	P_B16_15	% of B16_1 estimated enrollment taught by TEN/TE faculty	(T_B16_15/	B16_12)*100	ratio[2]	RATIO	enrollment	HDO_MATH
17/0/0	4	B16_16	No. of large sections other FT faculty						
	4	B16_13	Total # of large sections						
	4	B16_12	Total enrollment in B16_1						
	N	ASSB16_	Average section size in B16_1	(B16_12/	B16_13)				
	N	T_B16_16	Total # of students taught by other FT faculty	(B16_16*ASSB16_1)					
	N	P_B16_16	% of B16_1 estimated enrollment taught by other FT faculty	(T_B16_16/	B16_12)*100	ratio[2]	RATIO	enrollment	HDO_MATH
5/0/0	4	B16_17	No. of large sections other PT faculty						
	4	B16_13	Total # of large sections						
	4	B16_12	Total enrollment in B16_1						
	N	ASSB16_	Average section size in B16_1	(B16_12 /	B16_13)				
	N	T_B16_17	Total # of students taught by other PT faculty	(B16_17*ASSB16_1)					
	N	P_B16_17	% of B16_1 estimated enrollment taught by other PT faculty	(T_B16_17/	B16_12)*100	ratio[2]	RATIO	enrollment	HDO_MATH
2/0/0	4	B16_18	No. of large sections GTA						
	4	B16_13	Total # of large sections						
	4	B16_12	Total enrollment in B16_1						
	N	ASSB16_	Average section size in B16_1	(B16_12/	B16_13)				
	N	T_B16_18	Total # of students taught by GTA	(B16_18*ASSB16_1)					
	N	P_B16_18	% of B16_1 estimated enrollment taught by GTA	(T_B16_18 /	B16_12)*100	ratio[2]	RATIO	enrollment	HDO_MATH
40.5/2/0	N	B16_12	estimated no. of enrollments for Ss taking in B16_1	B16_12/	1000	total[3]	DESCRIPT	enrollment per 1000	HDO_MATH
100/84/-	N	ASSB16_	Average section size in B16_1	(B16_12/	B16_13)	ratio	RATIO	section size	HDO_MATH

[1] Estimates weighted to produce national estimates using final adjusted weight.
[2] Variance estimate of uncertain reliability because of nonlinear component in ratio.
[3] May not total to 100 because of distance learning.

TABLE A2.7 Example of SUDAAN Output for First Value in Table FY.1 of 1995 Report.

DESCRIPTOR	PhD	MA	BA	OVERALL
P_B16_15	58.34	67.15	77.81	61.76
RHAT	0.58	0.67	0.78	0.62
SERHAT	0.04	0.12	0.10	0.03
WXSUM	52586.32	5744.89	9291.43	67622.63
WYSUM	30678.29	3857.54	7230.02	41765.85
DEFFRHAT	0.45	0.61	0.46	0.19
NSUM	61.00	35.00	72.00	168.00
WSUM	181.25	233.71	1012.91	1427.87

Appendix III

List of Responders to the Survey

Two-Year Respondents

Abraham Baldwin Agricultural College
Science & Mathematics

Alvin Community College
Mathematics

Andrew College
Natural Science & Mathematics

Anne Arundel Community College
Mathematics

Antelope Valley College
Division Mathematics & Science

Arapahoe Community College
Mathematics

Austin Community College, Northridge Campus
Mathematics

Baltimore City Community College
Mathematics, Engineering & Computer Science

Blinn College, Brenham
Mathematics & Engineering

Borough of Manhattan Community College
Mathematics

Brevard Community College, Titusville
Math/Science/Computer Science/Business

Brookhaven College
Mathematics

Broome Community College
Mathematics

Broward Community College, Central Campus
Mathematics

Burlington County College
Science, Mathematics & Technology Division

Butler County Community College
Mathematics

Cabrillo College
Mathematics

Capital Community College
Science & Mathematics

Catawba Valley Community College
Mathematics

Cecil Community College
Mathematics

Central Community College, Columbus
Arts & Sciences

Central Piedmont Community College
Mathematics & Sciences

Central Texas College, Killeen
Mathematics

Chattanooga State Technical Community College
Mathematics

Chemeketa Community College
Mathematics/Science/Electronics

Chesapeake College
Mathematics

Chipola Junior College
Mathematics, Natural & Social Sciences

Clackamas Community College
Mathematics

Coconino Community College, Flagstaff
Mathematics

Colby Community College
Mathematics

College of San Mateo
Mathematics & Science Division

College of Southern Idaho
Mathematics, Engineering & Computer Science

College of the Redwoods
Mathematics

Columbia College
Mathematics

Columbus State Community College
Mathematics

Community College of Aurora
Mathematics

Community College of Baltimore County, Catonsville
Computer Science, Engineering & Mathematics

Community College of Philadelphia
Mathematics

Cuesta College
Mathematics Division

Cuyamaca College
Mathematics

Danville Community College
Division of Arts & Sciences

Daytona Beach Community College
Mathematics

Delgado Community College
Mathematics

Dona Ana Branch Community College, Las Cruces
General Studies

Dutchess Community College
Mathematics, Physical & Computer Sciences

East Los Angeles College
Mathematics

Eastfield College
Science, Mathematics & Physical Education

Edmonds Community College
Mathematics

El Camino College
Mathematics

El Paso Community College, Northwest Center
Mathematics

Elgin Community College
Mathematics

Flathead Valley Community College
Mathematics

Florida Community College at Jacksonville, Downtown
Mathematics

Front Range Community College, Westminster
Mathematics, Science & Technology

Garden Community College
Science & Mathematics

Garland County Community College
Mathematics & Science Division

Glendale Community College, AZ
Mathematics

Glendale Community College, CA
Mathematics

Grand Rapids Community College
Mathematics

Green River Community College
Mathematics Division

Greenville Technical College
Mathematics

Gulf Coast Community College
Division of Mathematics

Harry S. Truman College
Mathematics

Housatonic Community College
Mathematics & Science

Inver Hills Community College
Mathematics

Isothermal Community College
Mathematics

Ivy Tech State College, East Central
Mathematics & Physical Sciences Program

Jefferson Davis Community College
Mathematics & Science Division

Johnson Community College
Mathematics

Johnson County Community College
Mathematics

Joliet Junior College
Mathematics

Jones County Junior College
Mathematics Division

Kingwood College
Mathematics

Kirkwood Community College, Cedar Rapids
Mathematics & Science

LaGuardia Community College
Mathematics

Lake City Community College
Mathematics

Lane Community College
Mathematics Division

Lansing Community College
Mathematics & Computer Science

Lincoln Land Community College
Mathematics & Engineering Science

Lorain County Community College
Division of Science & Mathematics

Macomb Community College
Mathematics & Science

Manatee Community College
Mathematics

Manchester Community College
Mathematics

Massasoit Community College
Mathematics

Maysville Community College
Science & Related Technologies

McDowell Technical Community College
CollegeTransfer/General Education

McHenry County College
Mathematics

Metropolitan Community College, South Omaha
Mathematics

Miami Dade Community College, Kendall Campus
Mathematics

Middlesex Community College
Mathematics

Middlesex County College
Mathematics

Montgomery College, Rockville
Mathematics

Moraine Valley Community College
Mathematics & Computer Science

Mountain View College
Mathematics

Mt. San Antonio College
Mathematics

New Hampshire Community Technical College, Berlin
Arts & Science

North Central Missouri College
Mathematics

North Idaho College
Mathematics

North Lake College
Mathematics, Science & Sport Science

North Shore Community College
Mathematics

Northern Essex Community College
Mathematics

Northern Virginia Community College, Alexandria
Science & Applied Technologies

Northwest Arkansas Community College
Division of Science & Mathematics

Norwalk Community College, West Campus
Mathematics & Science

Oakland Community College, Highland Lake Campus
Mathematics

Oakton Community College
Mathematics

Ocean County College
Mathematics

Ohlone College
Mathematics

Oklahoma State University, Oklahoma City
Mathematics

Orange Coast College
Mathematics

Owensboro Community College
Mathematics

Paducah Community College
Mathematics

Paris Junior College
Mathematics

Parkland College
Mathematical & Computer Science

Passaic County Community College
Mathematics

Patrick Henry Community College
Arts, Science & Business Technology

Paul D. Camp Community College
Academic Programs

Penn State Berks-Lehigh Valley College
Mathematics

Penn State University, Dubois
Mathematics

Penn Valley Community College
Mathematics & Physical Science

Pensacola Junior College
Mathematics

Phoenix College
Mathematics

Pierce College Fort Steilacoom
Mathematics

Pima Community College, East Campus
Department of Math/Physics/Astronomy/Engineering

Portland Community College
Mathematics

Quincy College
Liberal Arts & Science

Raritan Valley Community College
Mathematics

Red Rocks Community College
Mathematics

Rochester Community and Technical College
Mathematics & Computer Science

Rockland Community College
Mathematics

Rogue Community College, Redwood Campus
Mathematics

Saddleback College
Mathematics

Saint Louis Community College, Florissant Valley
Mathematics

Salem Community College
Mathematics Cluster

Salt Lake Community College
Mathematics

San Diego Mesa College
Mathematics

San Joaquin Delta College
Science & Mathematics Division

San Jose City College
Mathematics

Sandhills Community College
Mathematics

Santa Ana College
Mathematics

Santa Barbara City College
Mathematics

Santa Monica College
Mathematics

Schoolcraft College, Livonia
Mathematics

Scottsdale Community College
Mathematics

Seattle Central Community College
Mathematics

Sinclair Community College
Mathematics

Skagit Valley College
Mathematics

South Seattle Community College
Mathematics

South Suburban College
Mathematics & Computer Science

South Texas Community College
Mathematics

Southwest Virginia Community College
Mathematics, Science & Health Technology Division

Southwestern College
Mathematics & Engineering

Southwestern Illinois College
Mathematics

Spring Valley Campus
Mathematics & Science

St. Charles County Community College
Mathematics & Engineering

St. Petersburg Junior College, Tarpon Springs
Mathematics

Suffolk County Community College, Ammerman Campus
Mathematics

Tacoma Community College
Mathematics

Tarrant County College, South
Mathematics

Temple College
Mathematics

Texarkana College
Physical Sciences Division

Thomas Nelson Community College
Mathematics

Trident Tech College
Mathematics

Trinity Valley Community College, Athens
Mathematics & Science

Tulsa Community College, Metro Campus
Science & Mathematics

Tunxis Community College
Mathematics, Science & Technology

Turtle Mountain Community College
Mathematics

Tyler Junior College
Mathematics

Utah Valley State College
Mathematics

Valencia Community College, Winter Park
Mathematics

Vernon Regional Community College
Mathematics & Sciences

Vincennes University
Mathematics

Virginia Highlands Community College
Science & Engineering

Volunteer State Community College
Mathematics

West Valley College
Mathematics

West Virginia Northern Community College
Division of Science/Math/Technologies

Whatcom Community College
Mathematics

William Rainey Harper College
Mathematical Sciences

Wright College
Mathematics

Four-Year Mathematics Respondents

Adams State College
Mathematics & Computer Science

Alice Lloyd College
Natural Sciences & Mathematics

American University
Mathematics & Statistics

Appalachian State University
Mathematical Sciences

Arizona State University
Mathematics

Assumption College
Mathematics & Computer Science

Ball State University
Mathematical Sciences

Beaver College
Mathematics & Computer Science

Boston University
Mathematics & Statistics

Bowling Green State University
Mathematics & Statistics

Bradley University
Mathematics

Brandeis University
Mathematics

California State University, Sacramento
Mathematics & Statistics

California State University, Northridge
Mathematics

California State University, Chico
Mathematics & Statistics

Case Western Reserve University
Mathematics

Central Michigan University
Mathematics

Central Missouri State University
Mathematics & Computer Science

Central Washington University
Mathematics

City College of New York
Mathematics

Clarion University
Mathematics

Clark University
Mathematics & Computer Science

Clarkson University
Mathematics & Computer Science

College of New Jersey
Mathematics & Statistics

College of Wooster
Mathematical Sciences

Colorado State University
Mathematics

Concordia University
Mathematics & Computer Science

CUNY, Queens College
Mathematics

Defiance College
Mathematics

Delta State University
Mathematics

Denison University
Mathematics & Computer Science

Doane College
Mathematics

Drury University
Mathematics & Computer Science

Eastern Michigan University
Mathematics

Emporia State University
Mathematics & Computer Science

Endicott College
Arts & Sciences Division

Fairmont State College
Mathematics

Florida International University
Mathematics

Fordham University
Mathematics

Frostburg State University
Mathematics

Gallaudet University
Mathematics & Computer Science

Golden Gate University
Mathematics & Natural Sciences

Goshen College
Mathematics

Grambling State University
Mathematics & Computer Science

Hood College
Mathematics & Computer Science

Indiana University
Mathematics

Indiana University-Purdue University, Indianapolis
Mathematics

Indiana University South Bend
Mathematics & Computer Science

Indiana Wesleyan University
Mathematics

John Brown University
Mathematics

Kentucky State University
Mathematics & Science

Lamar University
Mathematics

Liberty University
Mathematics & Computer Science

Linfield College
Mathematics

Loyola College
Mathematical Sciences

Loyola University of Chicago
Mathematics & Computer Science

Merrimack College
Mathematics

Miami University
Mathematics & Statistics

Michigan Technological University
Mathematical Sciences

Midwestern State University
Mathematics

Minot State University
Mathematics & Computer Science

Mississippi State University
Mathematics & Statistics

Missouri Western State College
Computer Science, Mathematics & Physics

Monmouth University
Mathematics

Montclair State University
Mathematical Sciences

Nazareth College
Mathematics & Computer Science

Neumann College
Mathematics

New Hampshire College
Mathematics & Science

New York Institute of Technology, Central Islip Campus
Mathematics

New York Institute of Technology, Old Westbury Campus
Mathematics

New York University
Mathematics

Nicholls State University
Mathematics

North Carolina State University
Mathematics

North Central College
Mathematics

North Georgia College & State University
Mathematics & Computer Science

Northeastern University
Mathematics

Northwestern University
Mathematics

Notre Dame College of Ohio
Mathematics

Oakland University
Mathematics & Statistics

Ohio State University, Columbus
Mathematics

Oral Roberts University
Mathematics & Computer Science

Oregon State University
Mathematics

Pacific Lutheran University
Mathematics

Penn State University
Mathematics

Pittsburg State University
Mathematics

Portland State University
Mathematical Sciences

Purdue University, West Lafayette
Mathematics

Rhode Island College
Mathematics & Computer Science

Rice University
Mathematics

Richard Stockton College of New Jersey
Natural & Mathematical Sciences

Rochester Institute of Technology
Mathematics & Statistics

Rocky Mountain College
Mathematics

Saint Michaels College
Mathematics

Seattle University
Mathematics

Shawnee State University
Mathematical Sciences

Simon's Rock College of Bard
Mathematics

Smith College
Mathematics

Sonoma State University
Mathematics

Southeastern Louisiana University
Mathematics & Statistics

Southern Illinois University, Carbondale
Mathematics

St. Thomas Aquinas College
Natural Sciences & Mathematics

SUNY, Buffalo
Mathematics

SUNY, Stony Brook
Applied Mathematics & Statistics

SUNY, College at Fredonia
Mathematics & Computer Science

SUNY, Farmingdale College of Technology
Mathematics

Swarthmore College
Mathematics & Statistics

Syracuse University
Mathematics

Taylor University
Mathematics

Texas A&M University
Mathematics

Texas Christian University
Mathematics

Thiel College
Mathematics & Computer Science

Trinity International University
Mathematics & Computer Information Systems

Tufts University
Mathematics

University of Alabama
Mathematics

University of Alaska
Mathematical Sciences

University of Arizona
Mathematics

University of California, Los Angeles
Mathematics

University of California, Santa Barbara
Mathematics

University of Central Florida
Mathematics

University of Colorado, Boulder
Mathematics

University of Colorado, Denver
Mathematics

University of Dayton
Mathematics

University of Florida
Mathematics

University of Georgia
Mathematics

University of Hawaii, Hilo
Mathematics

University of Illinois, Chicago
Mathematics, Statistics, & Computer Science

University of Illinois, Urbana-Champaign
Mathematics

University of Iowa
Mathematics

University of Kentucky
Mathematics

University of Louisville
Mathematics

University of Maine, Machias
Mathematics

University of Maryland, Baltimore County
Mathematics & Statistics

University of Massachusetts, Lowell
Mathematical Sciences

University of Michigan, Dearborn
Mathematics & Statistics

University of Michigan, Flint
Mathematics

University of Minnesota
School of Mathematics

University of Missouri, Rolla
Mathematics & Statistics

University of Nebraska at Omaha
Mathematics

University of North Carolina, Charlotte
Mathematics

University of North Carolina, Greensboro
Mathematical Sciences

University of North Dakota
Mathematics

University of North Florida
Mathematics & Statistics

University of Rochester
Mathematics

University of Southern Mississippi
Mathematics

University of St. Thomas
Mathematics

University of Tampa
Mathematics

University of Tennessee, Chattanooga
Mathematics

University of Texas, Dallas
Mathematical Sciences

University of Texas, San Antonio
Mathematics & Statistics

University of Virginia
Mathematics

University of Virginia's College at Wise
Mathematical Sciences

University of Wisconsin, Madison
Mathematics

University of Wyoming
Mathematics

Upper Iowa University
Science & Mathematics

Ursinus College
Mathematics & Computer Science

Utah State University
Mathematics & Statistics

Warren Wilson College
Mathematics & Computer Science

Washburn University
Mathematics & Statistics

Washington State University
Pure & Applied Mathematics

Washington University
Mathematics

Washington University
Systems Sciences & Mathematics

Webster University
Mathematics & Computer Science

West Virginia University
Mathematics

Western Michigan University
Mathematics & Statistics

Western New England College
Mathematics & Computer Science

Wichita State University
Mathematics & Statistics

Wilkes University
Mathematics & Computer Science

Four-Year Statistics Respondents

Bowling Green State University
Applied Statistics & Operations Research

Brigham Young University
Statistics

California State University, Hayward
Statistics

Carnegie Mellon University
Statistics

Colorado State University
Statistics

Cornell University
Biometrics

Florida State University
Statistics

George Mason University
Applied & Engineering Statistics

Iowa State University
Statistics

Kansas State University
Statistics

Louisiana State University
Experimental Statistics

Michigan State University
Statistics & Probability

North Dakota State University
Statistics

Ohio State University, Columbus
Statistics

Oklahoma State University
Statistics

Oregon State University
Statistics

Pennsylvania State University
Statistics

Purdue University
Statistics

St. Cloud State University
Statistics

Stanford University
Statistics

New York University, Stern School of Business
Statistics & Operations Research

Texas A&M University
Statistics

George Washington University
Statistics

University of California, Santa Barbara
Statistics & Applied Probability

University of California, Davis
Statistics

University of California, Riverside
Statistics

University of Central Florida
Statistics

University of Chicago
Statistics

University of Connecticut
Statistics

University of Florida
Statistics

University of Illinois, Urbana-Champaign
Statistics

University of Iowa
Statistics & Agricultural Science

University of Michigan
Statistics

University of Minnesota
School of Statistics

University of Missouri, Columbia
Statistics

University of North Carolina, Chapel Hill
Statistics

University of Pennsylvania
Statistics

University of Pittsburgh
Statistics

University of South Carolina, Columbia
Statistics

University of Tennessee, Knoxville
Statistics

University of Virginia
Statistics

University of Wisconsin, Madison
Statistics

University of Wyoming
Statistics

Virginia Polytechnic Institute and State University
Statistics

West Virginia University
Statistics

Four-Year Mathematics Questionnaire

General Instructions

- As part of a random sample your department has been selected to participate in the CBMS2000 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. Do not leave any unshaded box blank; enter a zero instead.

- Please report on undergraduate programs in the mathematical sciences (including applied mathematics, statistics, and operations research) and computer science *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 department.

- If your college or university does not recognize tenure please check the following box……………….. ☐ and follow the instructions in each section about where to report your permanent full-time faculty and your other full-time faculty.

- We have classified your department as belonging to a four-year college or university. If this is not correct please contact David Lutzer, Survey Director, at the telephone number or e-mail address below.

- If you have any questions while filling out this form, please contact David Lutzer, Survey Director, by phone at 757-221-4006 or by e-mail at lutzer@math.wm.edu.

Please return your completed questionnaire in the enclosed envelope to:

CBMS Survey

UNC Survey Research Unit
730 Airport Road, Suite 103
CB #2400, UNC-CH
Chapel Hill, NC 27599-2400

Mathematics Questionnaire

A. General Information

PLEASE PRINT CLEARLY

A1. Name of your institution: ______________________________

A2. Name of your department: ______________________________

A3. We have classified your department as being part of a four-year college or university. Do you agree?

Yes…………………… ☐ (1) → if "yes" go to A4 (below).

No…………………….. ☐ (2) → if "no" please call David Lutzer, Survey Director, at 757-221-4006 before proceeding any further.

A4. Is your institution public or private (*check one*)?

Public ☐ (1) Private ☐ (2) Other ☐ (3)

A5. Which programs leading to the following degrees does your department offer? (Check all boxes that apply.)

	None	Baccalaureate	Masters	Doctoral
Mathematics	☐ (1)	☐ (2)	☐ (3)	☐ (4)
Statistics	☐ (5)	☐ (6)	☐ (7)	☐ (8)
Biostatistics	☐ (9)	☐ (10)	☐ (11)	☐ (12)
Computer Science	☐ (13)	☐ (14)	☐ (15)	☐ (16)
Other *(please specify below)*	☐ (17)	☐ (18)	☐ (19)	☐ (20)

____

A6. Responses to this question will be used to project total enrollment for the current academic year, 2000–2001, by the pattern of enrollment in all of your department's courses for the <u>previous academic year</u>, 1999–2000.

Fall 1999 total student enrollment in your department's undergraduate courses: ☐ (1)

Entire academic year 1999-2000 enrollment in your department's undergraduate courses: ☐ (2)

Calculus II in Winter/Spring 2000 total enrollment: ☐ (3)

Calculus II in Winter/Spring 2000 total number of sections: ☐ (4)

Mathematics Questionnaire

A. General Information cont.

A7. Which of the following best describes your academic calendar? *(Check only one answer.)*

- Semester ☐ (1)
- Trimester ☐ (2)
- Quarter ☐ (3)
- 4-1-4 ☐ (4)
- Other *(please specify)* ________ ☐ (5)

A8. Contact person in your department: ☐

A9. Contact person's e-mail address: ☐

A10. Contact person's phone number including area code: ☐

A11. Campus mailing address: ☐

B. Mathematics Courses (Fall 2000)

The following instructions apply throughout Sections B, C, D and E (pages 5-16). Please read them carefully before you begin filling out the tables.

- Throughout Sections B to E, count each lecture offering with separately scheduled recitation/problem sessions as one section. For certain courses, a row is provided in which to list, for the same course, all lecture sections with recitation/problem sessions separately from all sections without recitation/problem sessions. For example see B16, page 7.
- Report a section of a course as taught by a *Graduate Teaching Assistant* (GTA) only when that course is taught independently by the GTA; that is, the course is the GTA's "own" course.
- If your departmental course titles do not match some of our course titles, please use your best judgment to match them. If a given course is not taught in your department for the specified period or if it is never taught by your department, enter zero in the space provided. Please do not leave any item blank.
- If your college or university does not recognize tenure check the following box.. ☐ (1)
  and record sections taught by your permanent full-time faculty in Column (5) and sections taught by all other full-time faculty in Column (6).
- Full-time faculty in your department holding joint appointments with another department should be counted in Column (5) if they are tenured, tenure-eligible, or permanent within your department; otherwise, report them in Column (6) or (7) according to their budget level within your department.

					Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)}			
Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[a] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[b] (8)
MATHEMATICS								
REMEDIAL LEVEL								
B1. Arithmetic/Basic Math								
B2. Pre-algebra								
B3. Elementary Algebra (high school)								
B4. Intermediate Algebra (high school)								
B5. Other remedial level courses								

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is *NOT* physically present.
[b] Report only GTA's who teach a section independently.

B. Mathematics Courses (Fall 2000) cont.

					Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)}			
Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[a] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[b] (8)
MATHEMATICS (CONT.)								
INTRODUCTORY LEVEL, INCLUDING PRE-CALCULUS								
B6. College Algebra								
B7. Trigonometry								
B8. College Algebra & Trig.(combined)								
B9. Elementary Functions, Precalculus Mathematics, Analytic Geometry								
B10. Introduction to Mathematical Modeling								
B11. Mathematics for Liberal Arts								
B12. Finite Mathematics								
B13. Business Mathematics								
B14. Mathematics for Elementary School Teachers								
B15. All other introductory level mathematics courses								

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is _NOT_ physically present.

[b] Report only GTA's who teach a section independently.

Mathematics Questionnaire

B. Mathematics Courses (Fall 2000) cont.

					Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)}				Of the number in Column (4a), how many sections:				
Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[c] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[d] (8)	Use graphing calculators (9)	Include writing components such as reports or projects (10)	Require computer assign-ments (11)	Assign group projects (12)	Meet at least once a week in a setting that requires student computer use (13)
MATHEMATICS (CONT.)													
MAINSTREAM[a] CALCULUS I:													
B16-1.Lecture with separately scheduled recit./ problem sessions[b]													
B16-2.Other sections with enrollments of 35 or less													
B16-3.Other sections with enrollments above 35													
MAINSTREAM[a] CALCULUS II:													
B17-1.Lecture with separately scheduled recit./ problem sessions[b]													
B17-2.Other sections with enrollments of 35 or less													
B17-3.Other sections with enrollments above 35													

DO NOT LEAVE ANY UNSHADED BOX BLANK

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] A calculus course is mainstream if it leads to the usual upper division mathematical sciences courses.
[b] Remember: A calculus class along with its recitation/problem sessions is to be counted as one section.
[c] At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is *NOT* physically present.
[d] Report only GTA's who teach a section independently.

Mathematics Questionnaire

B. Mathematics Courses (Fall 2000) cont.

					Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)}				Of the number in Column (4a), how many sections:				
Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[c] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[d] (8)	Use graphing calculators (9)	Include writing components such as reports or projects (10)	Require computer assign-ments (11)	Assign group projects (12)	Meet at least once a week in a setting that requires student computer use (13)
MATHEMATICS (CONT.)													
MAINSTREAM[a] CALCULUS III (AND IV, ETC):													
B18-1.Lecture with separately scheduled recit./ problem sessions[b]													
B18-2.Other sections with enrollments of 35 or less													
B18-3.Other sections with enrollments above 35													
NON-MAINSTREAM CALCULUS I:													
B19-1.Lecture with separately scheduled recit./ problem sessions[b]													
B19-2.Other sections with enrollments of 35 or less													
B19-3.Other sections with enrollments above 35													

DO NOT LEAVE ANY UNSHADED BOX BLANK

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] A calculus course is mainstream if it leads to the usual upper division mathematical sciences courses.

[b] Remember: A calculus class along with its recitation/problem sessions is to be counted as one section.

[c] At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is *NOT* physically present.

[d] Report only GTA's who teach a section independently.

Mathematics Questionnaire

B. Mathematics Courses (Fall 2000) cont.

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[c] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)} Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[d] (8)
MATHEMATICS (CONT.)								
CALCULUS LEVEL								
B20. Non-mainstream[a, b] Calculus II (and III, etc.)								
B21. Differential Equations								
B22. Discrete Mathematics								
B23. Linear Algebra or Matrix Theory								
B24. Other calculus level courses								

DO NOT LEAVE ANY UNSHADED BOX BLANK

a A calculus course is mainstream if it leads to the usual upper division mathematical sciences courses.
b Remember: A calculus class along with its recitation/problem sessions is to be counted as one section.
c At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is *NOT* physically present.
d Report only GTA's who teach a section independently.

B. Mathematics Courses (Fall 2000) cont.

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	If not offered in Fall 2000, is it scheduled in Winter/Spring 2001? Y(es)/N(o) (4)
MATHEMATICS (CONT.)			
ADVANCED LEVEL			
B25. Introduction to Proofs			
B26. Modern Algebra I (and II)			
B27. Number Theory			
B28. Combinatorics			
B29. Actuarial Mathematics			
B30. Logic/Foundations of Mathematics			
B31. Discrete Structures			
B32. History of Mathematics			
B33. Geometry			
B34. Mathematics for Secondary School Teachers (methods, special content, etc.)			
B35. Advanced Calculus I (and II) and/or Real Analysis			

DO NOT LEAVE ANY UNSHADED BOX BLANK

B. Mathematics Courses (Fall 2000) cont.

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	If not offered in Fall 2000, is it scheduled in Winter/Spring 2001? Y(es)/N(o) (4)
MATHEMATICS (CONT.)			
UPPER LEVEL			
B36. Advanced Mathematics for Engineering and Physics			
B37. Advanced Linear Algebra			
B38. Vector Analysis			
B39. Advanced Differential Equations			
B40. Partial Differential Equations			
B41. Numerical Analysis			
B42. Applied Mathematics (Mathematical Modeling)			
B43. Complex Variables			
B44. Topology			
B45. Senior Seminar/Independent Study in Mathematics			
B46. All other advanced level mathematics courses			

DO NOT LEAVE ANY UNSHADED BOX BLANK

Give the names of (up to) two examples of (B46) with the largest enrollments:

B46-1.

B46-2.

C. Statistics Courses (Fall 2000)

Does your department offer any Statistics courses?

Yes…………………….. ☐ (1) → if "yes" go to C1-1 (below).

No……………………… ☐ (2) → if "no" go to D (page 14).

					Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)}				Of the number in Column (4a), how many sections:				
Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[b] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[c] (8)	Use graphing calculators (9)	Include writing components such as reports or projects (10)	Require computer assign-ments (11)	Assign group projects (12)	Meet at least once a week in a setting that requires student computer use (13)
STATISTICS													
Elementary Level													
Elementary Statistics: (no calculus prerequisite)		Report elementary statistics courses (no calculus prerequisite) in C1-1, C1-2 and C1-3 below.											
C1-1. Lecture with separately scheduled recit./problem sessions[a]													
C1-2. Other sections with enrollments of 35 or less													
C1-3. Other sections with enrollments above 35													
C2. Probability and Statistics (no calculus prerequisite)													
C3. Other elementary level statistics courses													

DO NOT LEAVE ANY UNSHADED BOX BLANK

Give the names of (up to) two examples of (C3) with the largest enrollments:

C3-1.

C3-2.

[a] Remember: An elementary statistics class along with its recitation/problem sessions is to be counted as one section.

[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is *NOT* physically present

[c] Report only GTA's who teach a section independently.

C. Statistics Courses (Fall 2000) cont.

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	If not offered in Fall 2000, is it scheduled in Winter/Spring 2001? Y(es)/N(o) (4)
STATISTICS (CONT.)			
UPPER LEVEL			
C4. Mathematical Statistics (calculus prerequisite)			
C5. Probability (calculus prerequisite)			
C6. Stochastic Processes			
C7. Applied Statistical Analysis			
C8. Design and Analysis of Experiments			
C9. Regression (and Correlation)			
C10. Biostatistics			
C11. Nonparametric statistics			
C12. Categorical data analysis			
C13. Sample Survey design and analysis			
C14. Statistical software & computing			
C15. Data management			
C16. Senior Seminar/Independent Studies in Statistics			
C17. All other upper level statistics courses			

DO NOT LEAVE ANY UNSHADED BOX BLANK

DO NOT LEAVE ANY UNSHADED BOX BLANK

D. Operations Research Courses (Fall 2000)

Does your department offer any Operations Research courses?

Yes.......................... ☐ (1) → if “yes” go to D1 (below).

No........................... ☐ (2) → if “no” go to E (page 15).

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	If not offered in Fall 2000, is it scheduled in Winter/Spring 2001? Y(es)/N(o) (4)
OPERATIONS RESEARCH			
D1. Intro. to Operations Research			
D2. Intro. to Linear Programming			
D3. All other O.R. courses			

DO NOT LEAVE ANY UNSHADED BOX BLANK

E. Computer Science Courses (Fall 2000)

Does your department offer any Computer Science courses?

Yes........................ ☐ (1) → if "yes" go to E1 (below).

No.......................... ☐ (2) → if "no" go to F (page 17).

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[b] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)} Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[c] (8)
COMPUTER SCIENCE								
LOWER LEVEL								
E1. Computers and Society								
E2. Introduction to Software Packages								
E3. Issues in Computer Science								
E4. Computer Programming I (C 101 '91)[a]								
E5. Computer Programming II (C 102 '91)[a]								
E6. Advanced Programming & Data Structures								
E7. Database Management Systems								
E8. Discrete Mathematics for CS								
E9. All other lower level CS courses								

DO NOT LEAVE ANY UNSHADED BOX BLANK

a Refers to courses described in Computing Curriculum 1991, Report of the ACM/IEEE-CS Joint Curriculum Task Force, ACM 1991.

b At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is *NOT* physically present.

c Report only GTA's who teach a section independently.

E. Computer Science Courses (Fall 2000) cont.

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[a] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)} Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[b] (8)
COMPUTER SCIENCE								
MIDDLE LEVEL								
E10. Intro. to Computer Systems								
E11. Assembly Language Programming								
E12. Intro. to Computer Organization								
E13. Intro. to File Processing								
E14. All other middle level CS courses								
UPPER LEVEL								
E15. All upper level CS courses								

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is _NOT_ physically present.

[b] Report only GTA's who teach a section independently.

F. Faculty Profile (Fall 2000)

F1. This question investigates the educational background of your full-time and part-time faculty.

Instructions:

- In columns (1)-(4), include all departmental faculty according to tenure or tenure-eligible status, distinguishing between such faculty on leave and not on leave.
- For full-time faculty members in your department with joint appointments, report them as *Tenured* or *Tenure-eligible* if that describes their status within your department; otherwise, report them as *Other Full-time* or *Part-time* according to their budget level within your department for Fall 2000.
- DO NOT report any GTA's in **any** of the tables in this section.
- If your institution does not recognize tenure, please check the following box... ☐ (1) and then report full-time faculty who are "permanent" in the *Tenured* column (distinguishing between those not on leave and on leave), and all other full-time faculty in the *Other Full-Time* column (without distinguishing between those not on leave and on leave), and report zero in columns 3 and 4.

HIGHEST DEGREE AND GENDER		TYPE OF APPOINTMENT: TENURED — NOT ON LEAVE (1)	TENURED — ON LEAVE (2)	TENURE-ELIGIBLE — NOT ON LEAVE (3)	TENURE-ELIGIBLE — ON LEAVE (4)	OTHER FULL-TIME (5)	PART-TIME (NOT GTAS) (6)	Row Totals (7)
WITH DOCTORATE	MALE (1)							
	FEMALE (2)							
WITHOUT DOCTORATE	MALE (3)							
	FEMALE (4)							
COLUMN TOTALS (5)								

GRAND TOTAL

DO NOT LEAVE ANY UNSHADED BOX BLANK

F. Faculty Profile (Fall 2000) cont.

F2. This question investigates the ethnic and gender status of your full-time and part-time faculty.

Instructions: Same as F1 (Note: Grand Total for F2 should equal Grand Total for F1.)

Ethnic/Racial Status and Gender			Type of Appointment						Row Totals
			Tenured		Tenure-eligible		Other Full-time	Part-time (not GTAs)	
			Not on leave (1)	On leave (2)	Not on leave (3)	On leave (4)	(5)	(6)	(7)
American Indian, Eskimo, Aleut	Male	(1)							
	Female	(2)							
Asian, Pacific Islander	Male	(3)							
	Female	(4)							
Black or African American (non-Hispanic)	Male	(5)							
	Female	(6)							
Mexican American, Puerto Rican, or other Hispanic	Male	(7)							
	Female	(8)							
White (non-Hispanic)	Male	(9)							
	Female	(10)							
Status not known or Other	Male	(11)							
	Female	(12)							
Column Totals		(13)							

DO NOT LEAVE ANY UNSHADED BOX BLANK

Grand Total

F. Faculty Profile (Fall 2000) cont.

F3. For all faculty reported in the tenured and tenure-eligible columns of F1, report the number of faculty who belong to each of the age categories below. In case your institution does not recognize tenure, report only your permanent full-time faculty in the Tenured Faculty rows and exclude all other faculty, placing zeros in all boxes in rows (3) and (4).

Note:

- If your institution recognizes tenure then the Grand Total in F3 should equal the sum of columns (1)-(4) in F1.
- If your institution does not recognize tenure then the Grand Total in F3 should equal the sum of columns (1) and (2) in F1.

FACULTY AGE		Under 30 (1)	30-34 (2)	35-39 (3)	40-44 (4)	45-49 (5)	50-54 (6)	55-59 (7)	60-64 (8)	65-69 (9)	70 & over (10)	Row Totals (11)
TENURED FACULTY	Male (1)											
	Female (2)											
TENURE-ELIGIBLE FACULTY	Male (3)											
	Female (4)											
COLUMN TOTALS (5)												

GRAND TOTAL

DO NOT LEAVE ANY UNSHADED BOX BLANK

F4. For the period from 01 September 1999 through 31 August 2000, please report the number of your tenured or tenure-eligible faculty who: [if your institution does not recognize tenure, report on those who are “permanent” full-time]

Died while in full-time service.. ☐ (1)

Left full-time service due to retirement.. ☐ (2)

F. Faculty Profile (Fall 2000) cont.

F5. Does your organization offer a “transition to retirement program” in which faculty agree to retire at a fixed future date and gradually reduce their teaching assignments until that time?

Yes.......................... ☐ (1)

No........................... ☐ (2)

G. Departmental Information (Fall 2000)

G1. For Fall 2000, what is the expected (or typical) teaching load for the tenured or tenure-eligible faculty (those reported in F3 on the previous page)? [If your institution does not recognize tenure, report on those who are “permanent full-time”.]

Expected classroom contact hours per week.. ☐

G2. Please report the number of your departmental majors who where awarded a baccalaureate degree by your institution, between 01 July 1999 and 30 June 2000 (include double majors).

Number of baccalaureate degrees awarded to majors in your department.. ☐

G. Departmental Information (Fall 2000) cont.

G3. Of the number of degrees awarded above (G2), please report the number who majored in each of the following categories. [Be sure to report each graduating student only once. Use the "Other" category for any major that does not fit the existing categories.]

- Note: Grand Total should equal the figure given in G2.

AREA OF MAJOR	Male (1)	Female (2)	Row Totals (3)
1. MATHEMATICS (INCLUDING APPLIED)			
2. MATHEMATICS EDUCATION			
3. STATISTICS			
4. BIOSTATISTICS			
5. COMPUTER SCIENCE			
6. ACTUARIAL MATHEMATICS			
7. OPERATIONS RESEARCH			
8. JOINT COMPUTER SCIENCE AND MATHEMATICS			
9. JOINT MATHEMATICS AND STATISTICS			
10. OTHER TRACKS IN YOUR DEPARTMENT			
11. **COLUMN TOTALS**			
			GRAND TOTAL

DO NOT LEAVE ANY UNSHADED BOX BLANK

H. Faculty Teaching Statistics (Fall 2000)

H1. Does your department offer any Statistics courses?

Yes.......................... ☐ (1) → if “yes” go to H2 (below).

No.......................... ☐ (2) → if “no” go to I (page 23).

H2. In Fall 2000, how many different faculty members are teaching the statistics courses that you reported in Section C (pages 12-13)?

Number of different faculty members.. ☐

H3. Of the faculty members reported in Question H2, how many had at least a masters degree in statistics or biostatistics, or a doctoral degree in statistics or biostatistics, as of 01 September 2000?

Number with a doctoral degree in statistics/biostatistics.. ☐ (1)

Number with a masters degree, but not a doctoral degree, in statistics/biostatistics.......................... ☐ (2)

H4. For the faculty members teaching statistics courses (figure given in Question H2), what are the major fields of study for their highest earned degree? Complete the following table showing the number of faculty belonging in each box.

	MAJOR FIELD OF HIGHEST DEGREE							
HIGHEST DEGREE	STATISTICS (1)	BIOSTATISTICS (2)	MATHEMATICS (3)	MATHEMATICS EDUCATION (4)	COMPUTER SCIENCE (5)	SOCIAL SCIENCE (6)	EDUCATION (7)	OTHER (8)
DOCTORATE (1)								
MASTERS (2)								
OTHER (3)								

DO NOT LEAVE ANY UNSHADED BOX BLANK

Mathematics Questionnaire

I. Academic Support and Enrichment (Fall 2000)

I1. Does your department or university offer a mathematics placement test for entering freshmen?

Yes…………………….. ☐ (1) ⟶ if "yes" go to I2 (below).

No……………………… ☐ (2) ⟶ if "no" go to I7 (page 24).

I2. Is the placement examination required for entering freshmen?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

I3. What is the source of the placement test(s)? (Check all that apply.)

Test written by department…………………………………………………… ☐ (1)

Test provided by Educational Testing Service (ETS)……………………… ☐ (2)

Test provided by American College Testing Program (ACT)…………….. ☐ (3)

Test provided by Mathematical Association of America (MAA)…………… ☐ (4)

Other test provided by external source……………………………………… ☐ (5)

I4. Is it *required* that entering freshmen discuss the results of the placement test with an advisor before registering for their first mathematics course?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

I5. Does the placement examination lead to mandatory placement in the students' first mathematics course?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

I. Academic Support and Enrichment (Fall 2000) cont.

I6. Does your department periodically assess the effectiveness of the mathematics placement test?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

I7. Does your department or college operate a mathematics lab or tutoring center?

Yes…………………….. ☐ (1) ⟶ if "yes" go to I8 (below).

No……………………… ☐ (2) ⟶ if "no" go to I9 (page 25).

I8. Please check <u>all</u> services available to students through your mathematics lab or center. (Check all that apply.)

Computer-aided instruction……………………………………………. ☐ (1)

Computer software such as computer algebra packages or statistical packages……………………………………… ☐ (2)

Media such as video tapes……………………………………………. ☐ (3)

Tutoring by students…………………………………………………… ☐ (4)

Tutoring by paraprofessional staff…………………………………… ☐ (5)

Tutoring by part-time mathematics faculty………………………….. ☐ (6)

Tutoring by full-time mathematics faculty…………………………… ☐ (7)

Internet resources………………………………………………………... ☐ (8)

Other lab or center services
(please specify) ____ ☐ (9)

I. Academic Support and Enrichment (Fall 2000) cont.

I9. Please check the opportunities available to your undergraduate mathematics students. (Check all that apply.)

- Honors sections of mathematics courses………………………………………… ☐ (1)
- Mathematics club………………………………………………………………… ☐ (2)
- Special mathematics programs to encourage women…………………………… ☐ (3)
- Special mathematics programs to encourage minorities………………………… ☐ (4)
- Opportunities to compete in mathematics contests……………………………… ☐ (5)
- Special mathematics lectures/colloquium, not part of a mathematics club……… ☐ (6)
- Mathematics outreach opportunities to local K-12 schools……………………… ☐ (7)
- Opportunities to participate in undergraduate research in mathematics ……… ☐ (8)
- Independent studies opportunities in mathematics……………………………… ☐ (9)
- Assigned faculty advisors in mathematics……………………………………… ☐ (10)
- Other (please specify) ____________________________ ☐ (11)

J. Pre-service Education of Elementary and Middle School Teachers (Fall 2000)

J1. Does your institution offer a program or major leading to certification as a teacher in some or all grades K-8?

Yes…………………….. ☐ (1) ⟶ if "yes" go to J2 (below).

No……………………… ☐ (2) ⟶ if "no" go to K1 (page 27).

J2. Do members of your department serve on a committee that determines what mathematics courses are part of that certification program?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

Mathematics Questionnaire

J. Pre-service Education of Elementary and Middle School Teachers (Fall 2000) cont.

J3. Does your department offer a mathematics course or course sequence, designed specifically for pre-service K-8 teachers?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

J4. Are special sections of some of your regular mathematics courses (those not in J3) designated for pre-service K-8 teachers?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

J5. Because states have different certification requirements for teachers at different levels and because the K-8 grades are grouped together differently by different states, the next questions ask separately about students preparing to teach in early grades (1-3) and later grades (including 5 and 6).

Including general education requirements, how many courses are pre-service teachers <u>required</u> to take <u>in your department</u>:

For early grade certification (grades 1-3)…………………………..………… ☐ (1)

For later grade certification (including grades 5 and 6)………………………… ☐ (2)

J6. In your judgement, which three of the following courses in your department are <u>most likely</u> to be taken by K-8 pre-service teachers? (Note: A total of 6 boxes should be checked, 3 in <u>each</u> column.)

	For Early Grade <u>Certification</u>	For Later Grade <u>Certification</u>
A multiple-term course designed for elementary education students………..	☐ (1)	☐ (2)
A single-term course designed for elementary education students…………..	☐ (3)	☐ (4)
College algebra………………………………………………………………..	☐ (5)	☐ (6)
Elementary functions, pre-calculus, analytic geometry……………………..….	☐ (7)	☐ (8)
Introduction to mathematical modelling……………………………………..……	☐ (9)	☐ (10)
Mathematics for liberal arts……………………………………………..………	☐ (11)	☐ (12)
Finite mathematics……………………………………………………..………..	☐ (13)	☐ (14)
Mathematics history……………………………………………………..…………	☐ (15)	☐ (16)
Calculus…………………………………………………………..…………..…	☐ (17)	☐ (18)
Geometry……………………………………………………………..……………	☐ (19)	☐ (20)
Statistics…………………………………………………………..……………...	☐ (21)	☐ (22)

Mathematics Questionnaire

K. Comments and Suggestions

K1. Amount of time required to complete this questionnaire was ______________ (hours).

K2. Suggestions for changes to the questionnaire (for CBMS2005):

Appendix V

Two-Year Mathematics Questionnaire

General Instructions

- As part of a random sample your department has been selected to participate in the CBMS2000 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. Do not leave any unshaded box blank; enter a zero instead.
- 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 some campuses are part of a multi-campus two-year college, special instructions may apply. Please consult the third paragraph of the cover letter mailed with this questionnaire. If that letter asked you to report on the entire multi-campus system to which you may belong, please check the following box………………………. ☐ and report data for the entire system. If you were not asked to report on your entire multi-campus system, then do not include data for branches or campuses of your college that are geographically or budgetarily separate from yours.
- 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, statistics, and computer science courses taught within your mathematics program or department.
- We have classified your department as belonging to a two-year college, or 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 Stephen Rodi at the e-mail or telephone number given below.
- If you have any questions, please contact Stephen Rodi, Associate Director for Two-Year Colleges, by e-mail at rodi@tenet.edu or by phone at 512-223-3301.

Please return your completed questionnaire in the enclosed envelope to:

CBMS Survey

UNC Survey Research Unit
730 Airport Road, Suite 103
CB #2400, UNC-CH
Chapel Hill, NC 27599-2400

Mathematics Questionnaire : Two-year Colleges

A. General Information

PLEASE PRINT CLEARLY

A1. Name of campus: ________________________________

A2. Name of your department: ________________________________

A3. Mailing address of the multi-campus organization to which your campus belongs (if any):

____

____

A4. We have classified your department as belonging to a two-year college, or to a college or campus within a two-year college system, or to a two-year branch of a university system. Do you agree?

Yes…………………… ☐ (1) ⟶ if "yes" go to A5 (below).

No…………………….. ☐ (2) ⟶ if "no" please contact Stephen Rodi, Survey Associate Director, by e-mail (rodi@tenet.edu) or by phone at 512-223-3301 before proceeding any further.

A5. Is your institution public or private *(check one)*:

Public ☐ (1) Private ☐ (2) Other ☐ (3)

A6. What is the structural unit that directly administers the mathematics program on your campus? (Check only one of the following boxes.)

	at my campus	that is part of multi-campus organization (in A3)
Mathematics Department………………………………	☐ (1)	☐ (2)
Mathematics and Computer Science Department…...	☐ (3)	☐ (4)
Mathematics and Science Department or Division…..	☐ (5)	☐ (6)
Other Department or Division Structure………………	☐ (7)	☐ (8)
None of the above………………………………………	☐ (9)	

A7. To help us project enrollment for the current academic year (2000–2001), please give the following enrollment figures for the previous academic year (1999–2000).

Fall 1999 total student enrollment in your mathematics program: ☐ (1)

Entire academic year 1999-2000 enrollment in your mathematics program: ☐ (2)

Calculus II in Winter/Spring 2000 total enrollment: ☐ (3)

Calculus II in Winter/Spring 2000 total number of sections: ☐ (4)

Mathematics Questionnaire : Two-year Colleges

A. General Information (cont.)

A8. Which of the following best describes your academic calendar? *(Check only one answer.)*

Semester ☐ (1)

Trimester ☐ (2)

Quarter ☐ (3)

4-1-4 ☐ (4)

Other *(please specify)* ________________ ☐ (5)

A9. Are any of the developmental/remedial mathematics courses at your college administered separately from the mathematics department/program?

Yes ☐ (1)

No ☐ (2)

A10. Contact person in your department: ☐

A11. Contact person's e-mail address: ☐

A12. Contact person's phone number including area code: ☐

A13. Campus mailing address: ☐

B. Mathematics Faculty in the Mathematics Department/Program (Fall 2000)

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.
- Underlined faculty categories defined in this section will be used in later sections.

B1. For Fall 2000, what is the **total number of your full-time mathematics faculty**, 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, or tenure-eligible, or on your permanent staffing table (including faculty who are on leave or sabbatical)? We will refer to these as "**permanent full-time faculty**."

Number tenured, tenure-eligible, or on permanent staffing table.. [ ]

B3. Give the number of "**other full-time faculty**" by computing B1 minus B2.. [ ]

B4. Of the **permanent full-time faculty** reported in B2, how many teach extra hours for extra pay at your campus, or within your organization, or at other schools?

B4-a) Number of **permanent full-time faculty** in B2 who teach extra hours for extra pay at your campus or within your organization... [ ] (1)

B4-b) Number of faculty in B2 who teach extra hours for extra pay at other schools............................ [ ] (2)

B5. Of the **permanent full-time faculty** reported in B4-a (who teach extra hours for extra pay on your campus or in your organization), how many extra hours per week do they teach?

B5-a) Number who teach 1-3 hours extra weekly.. [ ] (1)

B5-b) Number who teach 4-6 hours extra weekly.. [ ] (2)

B5-c) Number who teach 7 or more hours extra weekly... [ ] (3)

B. Mathematics Faculty in the Mathematics Department/Program (Fall 2000) cont.

B6. For Fall 2000, what is the number of your **part-time mathematics faculty**? (Note: none of these where reported above.)

B6-a) Number **part-time mathematics faculty paid by your college**.................................. ☐ (1)

B6-b) Number of **part-time faculty paid by a third party**, such as a school district paying faculty to teach dual enrollment courses.. ☐ (2)

B6-c) Add (B6-a) + (B6-b) to get **total part-time faculty**.. ☐ (3)

B7. How many **part-time faculty** in (B6-a) (those paid by your college) teach six or more hours per week?

Number in (B6-a) teaching six or more hours/week... ☐

B8. Of the **part-time faculty** reported in (B6-a) (those paid by your college), give the number who are:

Employed full-time in high school.. ☐ (1)

Employed full-time in another two-year college.. ☐ (2)

Employed full-time in another department of your campus or your larger organization.............. ☐ (3)

Employed full-time in a four-year college... ☐ (4)

Employed full-time in industry or other... ☐ (5)

Graduate students... ☐ (6)

Not graduate students and not employed full-time anywhere... ☐ (7)

B. Mathematics Faculty in the Mathematics Department/Program (Fall 2000) cont.

B9. Are office hours required by college policy for the **part-time faculty** reported in Question B6-a on page 6 (those paid by your college)?

Yes.. ☐ (1)

No.. ☐ (2)

B10. Are the **part-time faculty** reported in Question B6-a (those paid by your college) typically paid on the same pay scale as **full-time faculty** members who teach extra hours for extra pay (and who were reported in Question B4-a on page 5)?

Yes.. ☐ (1)

No, part-timers paid more...................... ☐ (2)

No, part-timers paid less....................... ☐ (3)

C. Mathematics Courses (Fall 2000)

The following instructions apply throughout **Section C** (pages 8-13). Read them carefully before you begin filling out the tables.

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.
- In this section, do **not** include courses taught in other departments, learning centers, or developmental/remedial programs separate from your mathematics program or department.
- 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 (5) are those reported in B6-c on page 6 (part-time faculty paid by third parties as well as those paid by your college). Column (5) should **not** include any of your full-time faculty who teach an overload section.
- When completing an item, if that course is not taught at your campus during fall term, or if it is never taught at your campus, enter a zero in the space provided. Do not leave blanks.
- Use the additional spaces after C28 and C37 to write in the names of courses that do not fit reasonably under any listed title.

			LIST THE NUMBER OF SECTIONS FROM COLUMN (3)									
Name of Course (or equivalent) (1)	Total number of students enrolled Fall 2000 (2)	Total number of sections Fall 2000 (3)	with enroll-ment above 35 (4)	taught by part-time faculty[a] (5)	using graphing calcula-tors (6)	that include a writing component such as reports or projects (7)	that require computer assign-ments (8)	that assign group projects (9)	that meet at least once a week in a setting that requires student computer use (10)	that are taught mostly by the standard lecture method (11)	that are taught by distance learning[b] (12)	If not offered in Fall 2000, was this course either offered in 1999-2000 or scheduled for Winter/Spring 2001? Y(es)/N(o) (13)
C1. Arithmetic/Basic Math												
C2. Pre-Algebra												
C3. Elementary Algebra (high school level)												
C4. Intermediate Algebra (high school level)												
C5. Geometry (high school level)												

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B6-c, including those paid by a third party such as a school district.
[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, computer, programmed instruction or other method where the instructor is *NOT* physically present.

C. Mathematics Courses (Fall 2000) cont.

			LIST THE NUMBER OF SECTIONS FROM COLUMN (3)									
Name of Course (or equivalent) (1)	Total number of students enrolled Fall 2000 (2)	Total number of sections Fall 2000 (3)	with enroll-ment above 35 (4)	taught by part-time faculty[a] (5)	using graphing calcula-tors (6)	that include a writing component such as reports or projects (7)	that require computer assign-ments (8)	that assign group projects (9)	that meet at least once a week in a setting that requires student computer use (10)	that are taught mostly by the standard lecture method (11)	that are taught by distance learning[b] (12)	If not offered in Fall 2000, was this course either offered in 1999-2000 or scheduled for Winter/Spring 2001? Y(es)/N(o) (13)
C6. College Algebra (level beyond Intermediate Algebra)												
C7. Trigonometry												
C8. College Algebra and Trigonometry, combined												
C9. Introduction to Math Modelling												
C10. Precalculus/ Elementary Functions/ Analytic Geometry												

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B6-c, including those paid by a third party such as a school district.

[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, computer, programmed instruction or other method where the instructor is *NOT* physically present.

C. Mathematics Courses (Fall 2000) cont.

			LIST THE NUMBER OF SECTIONS FROM COLUMN (3)									
Name of Course (or equivalent) (1)	Total number of students enrolled Fall 2000 (2)	Total number of sections Fall 2000 (3)	with enroll-ment above 35 (4)	taught by part-time faculty[a] (5)	using graphing calcula-tors (6)	that include a writing component such as reports or projects (7)	that require computer assign-ments (8)	that assign group projects (9)	that meet at least once a week in a setting that requires student computer use (10)	that are taught mostly by the standard lecture method (11)	that are taught by distance learning[b] (12)	If not offered in Fall 2000, was this course either offered in 1999-2000 or scheduled for Winter/Spring 2001? Y(es)/N(o) (13)
C11. Calculus I (typically for math, physics, engineering majors)												
C12. Calculus II (typically for math, physics, engineering majors)												
C13. Calculus III												
C14. Non-Mainstream Calculus I[c]												
C15. Non-Mainstream Calculus II[c]												
C16. Differential Equations												
C17. Linear Algebra												
C18. Discrete Mathematics												

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B6-c, including those paid by a third party such as a school district.
[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, computer, programmed instruction or other method where the instructor is *NOT* physically present.
[c] Typically for business, life sciences, and social science majors.

C. Mathematics Courses (Fall 2000) cont.

Name of Course (or equivalent) (1)	Total number of students enrolled Fall 2000 (2)	Total number of sections Fall 2000 (3)	LIST THE NUMBER OF SECTIONS FROM COLUMN (3): with enroll-ment above 35 (4)	taught by part-time faculty[a] (5)	using graphing calcula-tors (6)	that include a writing component such as reports or projects (7)	that require computer assign-ments (8)	that assign group projects (9)	that meet at least once a week in a setting that requires student computer use (10)	that are taught mostly by the standard lecture method (11)	that are taught by distance learning[b] (12)	If not offered in Fall 2000, was this course either offered in 1999-2000 or scheduled for Winter/Spring 2001? Y(es)/N(o) (13)
C19. Elementary Statistics (with or without probability)[c]												
C20. Probability (with or without statistics)[c]												
C21. Finite Mathematics												
C22. Mathematics for Liberal Arts/ Math Appreciation												
C23. Mathematics for Elementary School Teachers												

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B6-c, including those paid by a third party such as a school district.
[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, computer, programmed instruction or other method where the instructor is *NOT* physically present.
[c] Do **not** count the same course in both lines C19 and C20.

C. Mathematics Courses (Fall 2000) cont.

			LIST THE NUMBER OF SECTIONS FROM COLUMN (3)									
Name of Course (or equivalent) (1)	Total number of students enrolled Fall 2000 (2)	Total number of sections Fall 2000 (3)	with enroll-ment above 35 (4)	taught by part-time faculty[a] (5)	using graphing calcula-tors (6)	that include a writing component such as reports or projects (7)	that require computer assign-ments (8)	that assign group projects (9)	that meet at least once a week in a setting that requires student computer use (10)	that are taught mostly by the standard lecture method (11)	that are taught by distance learning[b] (12)	If not offered in Fall 2000, was this course either offered in 1999-2000 or scheduled for Winter/Spring 2001? Y(es)/N(o) (13)
C24. Business Math (not a transfer course to four-year colleges)												
C25. Business Math (transfer course)												
C26. Non-Calculus-Based Technical Math (not a transfer course)												
C27. Calculus-Based Technical Math (transfer course)												
C28. Other Mathematics Courses												

DO NOT LEAVE ANY UNSHADED BOX BLANK

Give the titles of (up to) two examples of (C28) with the largest enrollments:

C28-1.

C28-2.

[a] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B6-c, including those paid by a third party such as a school district.

[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, computer, programmed instruction or other method where the instructor is *NOT* physically present.

C. Mathematics Courses (Fall 2000) cont.

			LIST THE NUMBER OF SECTIONS FROM COLUMN (3)									
Name of Course (or equivalent) (1)	Total number of students enrolled Fall 2000 (2)	Total number of sections Fall 2000 (3)	with enroll-ment above 35 (4)	taught by part-time faculty[a] (5)	using graphing calcula-tors (6)	that include a writing component such as reports or projects (7)	that require computer assign-ments (8)	that assign group projects (9)	that meet at least once a week in a setting that requires student computer use (10)	that are taught mostly by the standard lecture method (11)	that are taught by distance learning[b] (12)	If not offered in Fall 2000, was this course either offered in 1999-2000 or scheduled for Winter/Spring 2001? Y(es)/N(o) (13)
C29. Computers and Society												
C30. Introduction to Software Packages[c]												
C31. Issues in Computer Science												
C32. Computer Programming I (C 101 '91)[d]												
C33. Computer Programming II (C 102 '91)[d]												
C34. Advanced Programming & Data Structures												
C35. Database Management Systems												
C36. Discrete Math for CS												
C37. Other CS courses												

DO NOT LEAVE ANY UNSHADED BOX BLANK

Give the titles of (up to) two examples of (C37) with the largest enrollments:

C37-1.

C37-2.

[a] Do **not** include full-time mathematics faculty teaching an overload section in this column. Include only part-time faculty, reported in B6-c, including those paid by a third party such as a school district.

[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, computer, programmed instructions or other method where the instructor is *NOT* physically present.

[c] Word processing, spreadsheets, internet tools, etc.

[d] Refers to courses described in Computing Curriculum 1991, Report of the ACM/IEEE-CS Joint Curriculum Task Force, ACM 1991.

D. Faculty Educational Level, by Subject Field (Fall 2000)

D1. For the **permanent full-time faculty** (including those on leave) reported in Question B2 (page 5), complete the following table showing the area of each faculty member's highest earned degree. The Grand Total for this table should equal the number reported in Question B2 (page 5).

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.

	MAJOR FIELD OF HIGHEST DEGREE					
HIGHEST DEGREE	MATHEMATICS (1)	STATISTICS (2)	COMPUTER SCIENCE (3)	MATHEMATICS EDUCATION (4)	OTHER (5)	ROW TOTALS (6)
DOCTORATE (1)						
MASTERS (2)						
BACHELORS (3)						
LESS THAN BACHELORS (4)						
COLUMN TOTALS (5)						

GRAND TOTAL

DO NOT LEAVE ANY UNSHADED BOX BLANK

D. Faculty Educational Level, by Subject Field (Fall 2000) cont.

D2. For the **part-time faculty** reported in Question B6-c on page 6 (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 Grand Total for this table should equal the number reported in Question B6-c (page 6).

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.

	MAJOR FIELD OF HIGHEST DEGREE					
HIGHEST DEGREE	MATHEMATICS (1)	STATISTICS (2)	COMPUTER SCIENCE (3)	MATHEMATICS EDUCATION (4)	OTHER (5)	ROW TOTALS (6)
DOCTORATE (1)						
MASTERS (2)						
BACHELORS (3)						
LESS THAN BACHELORS (4)						
COLUMN TOTALS (5)						

DO NOT LEAVE ANY UNSHADED BOX BLANK

GRAND TOTAL

E. Faculty by Gender and Ethnicity/Race (Fall 2000)

Instructions:

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.
- For the **permanent full-time faculty** including those on leave reported in Question B2 on page 5, and for the **part-time faculty** reported in Question B6-a on page 6 (those paid by your college) complete the following table giving data about gender and ethnicity/race.
- The total of Column (1) should equal the figure given in Question B2 (page 5). The total of Column (2) should equal the figure reported in B6-a (page 6).

ETHNIC/RACIAL STATUS AND GENDER			Permanent Full-time Faculty from B2 (1)	Part-Time Faculty from B6-a (2)
American Indian, Eskimo, Aleut	Male	(1)		
	Female	(2)		
Asian, Pacific Islander	Male	(3)		
	Female	(4)		
Black or African American (non-Hispanic)	Male	(5)		
	Female	(6)		
Mexican American, Puerto Rican, or other Hispanic	Male	(7)		
	Female	(8)		
White (non-Hispanic)	Male	(9)		
	Female	(10)		
Status not known Or Other	Male	(11)		
	Female	(12)		
Column Totals		(13)		

DO NOT LEAVE ANY UNSHADED BOX BLANK

F. Faculty Age Profile (Fall 2000)

Complete the following table showing the number of faculty who belong in each of the age categories below.

- Consider **only permanent full-time faculty** (including those on leave) as reported in Question B2 on page 5.
- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.
- Report on all American Indian, Eskimo, Aleut, Asian, Pacific Islander, Black or African American (non-Hispanic), Mexican American, Puerto Rican or other Hispanic in Row (3) of the table.
- The sum of all the numbers reported in Rows (1) and (2) should equal the number reported in Question B2 on page 5.

FACULTY AGE	Under 30 (1)	30-34 (2)	35-39 (3)	40-44 (4)	45-49 (5)	50-54 (6)	55-59 (7)	60-64 (8)	65-69 (9)	70 & over (10)	Row Totals (11)
MEN (1)											
WOMEN (2)											
ETHNIC/RACIAL MINORITY[a] (3)											
WHITE (NON-HISPANIC) (4)											
STATUS UNKNOWN (5)											
COLUMN TOTALS (6)											

DO NOT LEAVE ANY UNSHADED BOX BLANK

GRAND TOTAL

[a] See instructions above for row 3.

G. Faculty Employment and Mobility (Fall 2000)

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.

G1. How many of the **full-time permanent faculty** members in Question B2 (page 5) were newly appointed on a full-time permanent basis this year (2000-2001)?

Number of faculty newly appointed on a full-time permanent basis………… ☐

if "zero" ⟶ go to G5 (page 19).

if "1 or more" ⟶ go to G2 (below).

G2. Of the faculty members listed in Question G1, how many had the following as their main activity in 1999-2000? Report only **one** main activity per person. Note: The total in G2 should equal the value given in G1.

Attending graduate school……	☐	(1)
Teaching in a four-year college or university……	☐	(2)
Teaching in another two-year college……	☐	(3)
Teaching in a secondary school……	☐	(4)
Part-time or full-time temporary employment by your college……	☐	(5)
Nonacademic employment……	☐	(6)
Unemployed……	☐	(7)
Status Unknown……	☐	(8)

G3. How many of the faculty reported in Question G1 had previously taught at your campus or in your larger organization either part-time or full-time? ☐

G. Faculty Employment and Mobility (Fall 2000) cont.

G4. For each **full-time permanent faculty** member reported in Question G1 (page 18), give the following data. Add more lines at the bottom of the table if necessary. For each new hire complete an entire row.

	Age (1)	Gender (2)	Ethnicity/Race (3)	Highest Degree Earned (Bachelors, Masters or Doctorate) (4)
New Hire #1 (1)				
New Hire #2 (2)				
New Hire #3 (3)				
New Hire #4 (4)				

G5. How many of your faculty who were **permanent full-time faculty** in the previous year (1999-2000) are no longer part of your **permanent full-time faculty**? ☐

G6. Give the number of **permanent full-time faculty** (reported in Question G5) who:

Died while in full-time service…………………………………………….. ☐ (1)

Left full-time service due to retirement……………………………….. ☐ (2)

Left to teach at a four-year college or university………………………. ☐ (3)

Left to teach at another two-year college………………………………. ☐ (4)

Left to teach at a secondary school..……………………………………. ☐ (5)

Left for a nonacademic position…………………………………………. ☐ (6)

Left to return to graduate school………………………………………… ☐ (7)

Other (specify)……………….…………………………………………….. ☐ (8)

Unknown……………………..…………………………………………….. ☐ (9)

G. Faculty Employment and Mobility (Fall 2000) cont.

G7. Does your organization offer a "transition to retirement program" in which **permanent full-time faculty** agree to retire at a fixed future date and gradually reduce their teaching assignments until that time?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

H. Professional Activities of Permanent Full-Time Faculty (Fall 2000)

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.

H1. Is some form of continuing education or professional development required of your **permanent full-time faculty** reported in Question B2 (page 5)?

Yes…………………….. ☐ (1) ⟶ if "yes" go to H2 (below).

No……………………… ☐ (2) ⟶ if "no" go to I (page 21).

H2. Estimate the number of **permanent full-time faculty** reported in Question B2 (page 5) who fulfill the requirement in H1 by:

Activities provided by your institution at one of its locations…………………..…. ☐ (1)

Participation in professional association meetings and minicourses or other professional association activities…………………………. ☐ (2)

Publishing expository or research articles or textbooks………………………….. ☐ (3)

Continuing graduate education……………………………………………..…….. ☐ (4)

Unknown………………………..…………………………………………………. ☐ (5)

Mathematics Questionnaire: Two-Year Colleges

I. Resources Available to Mathematics Faculty (Fall 2000)

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.

I1. How many of your **permanent full-time mathematics faculty** members (reported in Question B2 on page 5) have:

A computer in their campus office?……………………………………………….. ☐ (1)

No computer in their campus office, but shared computers nearby?………… ☐ (2)

No convenient access, or no access at all, to a computer at your college?….. ☐ (3)

I2. How many of your **permanent full-time mathematics faculty** members (reported in Question B2 on page 5) have Internet access:

In their office?………………………………………………………………………. ☐ (1)

Not in their office, but at school?…………………………………………………. ☐ (2)

No convenient access, or no access at all, to the Internet at your college?… ☐ (3)

I3. How many of the **part-time mathematics faculty** members paid by your college (reported in Question B6-a on page 6) have campus office space that contains:

Their own individual desk?…………………………………………………….. ☐ (1)

A desk shared with one other person?………………………………………….. ☐ (2)

A desk shared with more than one other person?…………………………….. ☐ (3)

I4. How many of the **part-time faculty** members paid by your college (reported in Question B6-a on page 6) have no campus office space at all?… ☐

- Note: The sum of all entries in I3 and I4 should equal the number reported in B6-a on page 6.

I. Resources Available to Mathematics Faculty (Fall 2000) cont.

I5. For which mathematics faculty do you periodically evaluate teaching? Check all that apply.

I5-1. We evaluate teaching of **permanent full-time faculty** (reported in B2 on page 5) ☐

I5-2. We evaluate teaching of **part-time faculty** paid by our college (reported in B6-a on page 6)……………………………………………………………………………. ☐

If you checked either I5-1 or I5-2, then ⟶ go to I6 (below).

If you did **not** check either I5-1or I5-2, then ⟶ go to J (below).

I6. Check all evaluation methods that are used for **part-time faculty** paid by your college (Question B6-a on page 6) or for **permanent full-time faculty** (Question B2 on page 5). (Check all that apply.)

	Part-time Faculty in B6-a	Full-time Faculty in B2
Observation of classes by other faculty members or department chair …………………………………………	☐ (1)	☐ (2)
Observation of classes by division head (if different from chair) or other administrator……………………………….	☐ (3)	☐ (4)
Evaluation forms completed by students…………………………………….	☐ (5)	☐ (6)
Evaluation of written course material such as lesson plans, syllabi, or exams ……………………………………………….	☐ (7)	☐ (8)
Self-evaluation such as teaching portfolios………………………………….	☐ (9)	☐ (10)
Other (specify): ______________________________	☐ (11)	☐ (12)

J. Academic Support and Enrichment Opportunities for Students (Fall 2000)

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.

J1. Does your department or college offer a mathematics placement program for entering students?

Yes…………………….. ☐ (1) ⟶ if "yes" go to J2 (page 23).

No……………………… ☐ (2) ⟶ if "no" go to J7 (page 24).

J. Academic Support and Enrichment Opportunities for Students (Fall 2000) cont.

J2. What is the source of the placement test(s)? (Check all that apply.)

Test written by department………………………………………………………….. ☐ (1)

Test provided by Educational Testing Service (ETS)……………………………. ☐ (2)

Test provided by American College Testing Program (ACT)…………………… ☐ (3)

Test provided by Mathematical Association of America (MAA)………………… ☐ (4)

Other test provided by external source……………………………………………. ☐ (5)

J3. Is the placement examination usually required for first time enrollees?

Yes…………………….. ☐ (1) → if "yes" go to J4 (below).

No……………………… ☐ (2) → if "no" go to J7 (page 24).

J4. Is it required that first time enrollees discuss the results of the placement test with an advisor before registering for their first mathematics course?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

J5. Does the placement examination lead to mandatory placement in the student's first mathematics course?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

J. Academic Support and Enrichment Opportunities for Students (Fall 2000) cont.

J6. Does your department periodically assess the effectiveness of the mathematics placement test?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

J7. Does your department or college operate a mathematics lab or tutoring center?

Yes…………………….. ☐ (1) ⟶ if "yes" go to J8 (below).

No……………………… ☐ (2) ⟶ if "no" go to J9 (page 25).

J8. Check <u>all</u> services available to students through your lab or center.
(Check all that apply.)

Computer-aided instruction………………………………………………………….. ☐ (1)

Computer software such as computer algebra
packages or statistical packages……………………………………………………. ☐ (2)

Media such as video tapes………………………………………………………….. ☐ (3)

Tutoring by students…………………………………………………………………. ☐ (4)

Tutoring by paraprofessional staff…………………………………………………. ☐ (5)

Tutoring by part-time mathematics faculty……………………………………….. ☐ (6)

Tutoring by full-time mathematics faculty…………………………………………. ☐ (7)

Internet resources……………………………………………………………………….. ☐ (8)

Other lab or center services
(please specify) ____ ☐ (9)

J. Academic Support and Enrichment Opportunities for Students (Fall 2000) cont.

J9. Check the opportunities in the following list available to your mathematics students. (Check all that apply.)

- Honors sections of mathematics program courses.................................... ☐ (1)
- Mathematics club.. ☐ (2)
- Special mathematics programs to encourage women.. ☐ (3)
- Special mathematics programs to encourage minorities...................................... ☐ (4)
- Opportunities to compete in mathematics contests.. ☐ (5)
- Special mathematics lectures/colloquium, not part of a mathematics club................... ☐ (6)
- Mathematics outreach opportunities to local K-12 schools.................................. ☐ (7)
- Opportunities to participate in undergraduate research in mathematics..................... ☐ (8)
- Independent studies opportunities in mathematics.. ☐ (9)
- Assigned faculty advisors in mathematics.. ☐ (10)
- Other (please specify) ____________________ ☐ (11)

K. Dual Enrollments (Fall 2000)

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.

K1. How many sections does your department offer <u>on a high school campus</u> that grant dual credit (high school and college) in the following courses?

	SPRING 2000 (= LAST TERM)	FALL 2000 (= CURRENT TERM)
College Algebra............	(1)	(2)
Precalculus/Elementary Functions, Analytic Geometry.....	(3)	(4)
Introduction to Mathematical Modeling............	(5)	(6)
Calculus I............	(7)	(8)
Statistics............	(9)	(10)

K. Dual Enrollments (Fall 2000) cont.

K2. Did you report any sections in K1 on page 25?

Yes…………………….. ☐ (1) ⟶ if "yes" go to K3 (below).

No……………………… ☐ (2) ⟶ if "no" go to L1 (page 27).

K3. For the dual enrollment courses in Question K1 (page 25), which of the following are the responsibility of your department? (Check only **one box per row**.)

	NEVER	SOMETIMES	ALWAYS
Choice of textbook………………………	☐ (1)	☐ (2)	☐ (3)
Design of syllabus………………………	☐ (4)	☐ (5)	☐ (6)
Design of final examination…………….	☐ (7)	☐ (8)	☐ (9)
Choice of instructor………………………	☐ (10)	☐ (11)	☐ (12)

K4. If you have a regular teaching evaluation program for part-time faculty paid by your college, complete this Question K4. If you do not have such a teaching evaluation program skip to Question K5 (below).

Are the instructors of the dual-credit course sections reported in Question K1 included in the regular teaching evaluation program conducted by your department, campus, or larger organization?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

K5. Do the instructors of the dual-credit course sections reported in Question K1 have to meet the same mathematics degree and/or graduate hours requirements as the part-time faculty who are paid by your college (reported in Question B6-a)?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

L. Pre-service Education of Elementary School Teachers (Fall 2000)

- If you are part of a multi-campus college, please consult the third bullet on page 2 before proceeding.

L1. Does your department have a faculty member assigned to coordinate mathematics program courses for pre-service elementary teachers?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

L2. Other than the courses reported in the table of courses on line C23 of page 11, do you designate any sections of your other mathematics program courses as “especially designed for pre-service elementary teachers”?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

M. Issues of Current Professional Concern (Fall 2000)

M1. Below are some problems cited by mathematics departments in the U.S. Please read each item carefully and check the box in each row that best reflects your view. (Check only **one box per row**.)

	NOT A PROBLEM FOR US	MINOR PROBLEM FOR US	MODERATE PROBLEM FOR US	MAJOR PROBLEM FOR US
MAINTAINING VITALITY OF FACULTY.................	☐ (1)	☐ (2)	☐ (3)	☐ (4)
DUAL CREDIT (HIGH SCHOOL & COLLEGE) COURSES..	☐ (5)	☐ (6)	☐ (7)	☐ (8)
STAFFING STATISTICS COURSES...	☐ (9)	☐ (10)	☐ (11)	☐ (12)
STAFFING COMPUTER SCIENCE COURSES...	☐ (13)	☐ (14)	☐ (15)	☐ (16)
NEED TO USE PART-TIME FACULTY FOR TOO MANY COURSES.................................	☐ (17)	☐ (18)	☐ (19)	☐ (20)
FACULTY SALARIES TOO LOW.......................	☐ (21)	☐ (22)	☐ (23)	☐ (24)
CLASS SIZES TOO LARGE.............................	☐ (25)	☐ (26)	☐ (27)	☐ (28)
LOW STUDENT MOTIVATION..........................	☐ (29)	☐ (30)	☐ (31)	☐ (32)
TOO MANY STUDENTS NEEDING REMEDIATION.....	☐ (33)	☐ (34)	☐ (35)	☐ (36)
LOW SUCCESS RATE IN DEVELOPMENTAL/ REMEDIAL COURSES..................................	☐ (37)	☐ (38)	☐ (39)	☐ (40)
LOW SUCCESS RATE IN TRANSFER-LEVEL COURSES...	☐ (41)	☐ (42)	☐ (43)	☐ (44)

Mathematics Questionnaire: Two-Year Colleges

M. Issues of Current Professional Concern (Fall 2000) cont.

M1. Continued

	NOT A PROBLEM FOR US	MINOR PROBLEM FOR US	MODERATE PROBLEM FOR US	MAJOR PROBLEM FOR US
TOO FEW STUDENTS WHO INTEND TO TRANSFER ACTUALLY DO TRANSFER.............................	☐ (45)	☐ (46)	☐ (47)	☐ (48)
INADEQUATE DEPARTMENTAL RESOURCES.........	☐ (49)	☐ (50)	☐ (51)	☐ (52)
INADEQUATE TRAVEL FUNDS FOR FACULTY.........	☐ (53)	☐ (54)	☐ (55)	☐ (56)
INADEQUATE COMPUTER FACILITIES FOR FACULTY USE..	☐ (57)	☐ (58)	☐ (59)	☐ (60)
INADEQUATE COMPUTER FACILITIES FOR STUDENT USE...	☐ (61)	☐ (62)	☐ (63)	☐ (64)
OUTSOURCING INSTRUCTION TO COMMERCIAL COMPANIES..	☐ (65)	☐ (66)	☐ (67)	☐ (68)
INADEQUATE CLASSROOM SPACE....................	☐ (69)	☐ (70)	☐ (71)	☐ (72)
COORDINATING MATHEMATICS COURSES WITH HIGH SCHOOLS	☐ (73)	☐ (74)	☐ (75)	☐ (76)
LACK OF CURRICULAR FLEXIBILITY BECAUSE OF TRANSFER REQUIREMENTS	☐ (77)	☐ (78)	☐ (79)	☐ (80)
USE OF DISTANCE EDUCATION[a]..	☐ (81)	☐ (82)	☐ (83)	☐ (84)

OTHER (PLEASE SPECIFY):____

[a] At least half of the students in the section receive the majority of their instruction via Internet, TV, computer, programmed instruction or other method where the instructor is *NOT* physically present.

N. Mathematics Enrollments Outside Your Mathematics Department/Program (Fall 2000)

Officers of your professional societies have encouraged us to investigate this issue even though it involves data that is often 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 mathematics/statistics/computer science courses that are **not** taught in the mathematics department/program. (We need enrollments, not the number of sections taught.)

Instructions:

- Report all mathematics/statistics/computer science enrollments at your campus or multi-campus system that are **not** taught in the mathematics department/program (and so not listed in Question C on pages 8-13). Please consult the third bullet on page 2 before proceeding to determine whether to report on your campus or on your entire multi-campus system.
- 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. If no such courses are offered, enter "0".

	ENROLLMENT IN COURSES GIVEN BY DEPARTMENT OR DIVISION						
COURSE (1)	NATURAL SCIENCES (2)	OCCUPATIONAL PROGRAMS (3)	BUSINESS (4)	SOCIAL SCIENCES (5)	COMPUTER SCIENCE (6)	LEARNING CENTER (7)	OTHER DEPT/DIVISION (8)
N1. Arithmetic/Pre-Algebra							
N2. Elementary Algebra (high school level)							
N3. Intermediate Algebra (high school level)							
N4. College Algebra (level is beyond intermediate algebra)							
N5. Trigonometry or Precalculus							
N6. Calculus or Differential Equations							
N7. Business Mathematics							
N8. Statistics/Probability							
N9. Technical Mathematics							
N10. All other mathematics courses							

DO NOT LEAVE ANY UNSHADED BOX BLANK

O. Comments and Suggestions

O1. Amount of time required to complete this questionnaire: ______________ (hours)

O2. 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., CBMS2005).

Appendix VI

Four-Year Statistics Questionnaire

General Instructions

- As part of a random sample your department has been selected to participate in the CBMS2000 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. Do not leave any unshaded box blank; enter a zero instead.
- Please report on undergraduate programs in statistics and computer science *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 department.
- If your college or university does not recognize tenure please check the following box……………………….. ☐ and follow the instructions in each section about where to report your permanent full-time faculty and your other full-time faculty.
- We have classified your department as belonging to a four-year college or university. If this is not correct please contact David Lutzer, Survey Director, at the telephone number or e-mail address below.
- If you have any questions while filling out this form, please contact David Lutzer, Survey Director, by phone at 757-221-4006 or by e-mail at lutzer@math.wm.edu.

Please return your completed questionnaire in the enclosed envelope to:

CBMS Survey
UNC Survey Research Unit
730 Airport Road, Suite 103
CB #2400, UNC-CH
Chapel Hill, NC 27599-2400

Statistics Questionnaire

A. General Information

PLEASE PRINT CLEARLY

A1. Name of your institution: ______________________________

A2. Name of your department: ______________________________

A3. We have classified your department as being part of a four-year college or university. Do you agree?

Yes…………………… ☐ (1) → if "yes" go to A4 (below).

No…………………….. ☐ (2) → if "no" please call David Lutzer, Survey Director, at 757-221-4006 before proceeding any further.

A4. Is your institution public or private *(check one)*?

Public ☐ (1) Private ☐ (2) Other ☐ (3)

A5. Which programs leading to the following degrees does your department offer? (Check all boxes that apply.)

	None	Baccalaureate	Masters	Doctoral
Mathematics	☐ (1)	☐ (2)	☐ (3)	☐ (4)
Statistics	☐ (5)	☐ (6)	☐ (7)	☐ (8)
Biostatistics	☐ (9)	☐ (10)	☐ (11)	☐ (12)
Computer Science	☐ (13)	☐ (14)	☐ (15)	☐ (16)
Other *(please specify below)*	☐ (17)	☐ (18)	☐ (19)	☐ (20)

____

A6. Responses to this question will be used to project total enrollment for the current academic year, 2000–2001, by the pattern of enrollment in all of your department's courses for the previous academic year, 1999–2000.

Fall 1999 total student enrollment in your department's undergraduate courses: ☐ (1)

Entire academic year 1999-2000 enrollment in your department's undergraduate courses: ☐ (2)

A. General Information cont.

A7. Which of the following best describes your academic calendar? *(Check only one answer.)*

- Semester ☐ (1)
- Trimester ☐ (2)
- Quarter ☐ (3)
- 4-1-4 ☐ (4)
- Other *(please specify)* ______ ☐ (5)

A8. Contact person in your department: ______

A9. Contact person's e-mail address: ______

A10. Contact person's phone number including area code: ______

A11. Campus mailing address: ______

B. Statistics Courses (Fall 2000)

Instructions:

The following instructions apply throughout Sections B and C (pages 6-9). Please read them carefully before you begin filling out the tables.

- Throughout Questions B and C, count each lecture offering with separately scheduled recitation/problem sessions as one section. For certain courses, a row is provided in which to list, for the same course, all lecture sections with recitation/problem sessions separately from all sections without recitation/problem sessions. For example see B1, page 6.

- Report a section of a course as taught by a *Graduate Teaching Assistant* (GTA) only when that course is taught independently by the GTA; that is, the course is the GTA's "own" course.

- If your departmental course titles do not match some of our course titles, please use your best judgment to match them. If a given course is not taught in your department for the specified period or if it is never taught by your department, enter zero in the space provided. Please do not leave any unshaded item blank.

- If your college or university does not recognize tenure check the following box.. ☐ (1) and record sections taught by your permanent full-time faculty in Column (5) and sections taught by all other full-time faculty in Column (6).

- Full-time faculty in your department holding joint appointments with another department should be counted in Column (5) if they are tenured, tenure-eligible or permanent within your department; otherwise, report them in Column (6) or (7) according to their budget level within your department.

Statistics Questionnaire

B. Statistics Courses (Fall 2000) cont.

					Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)}				Of the number in Column (4a), how many sections:				
Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[b] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[c] (8)	Use graphing calculators (9)	Include writing components such as reports or projects (10)	Require computer assign-ments (11)	Assign group projects (12)	Meet at least once a week in a setting that requires student computer use (13)
STATISTICS													
ELEMENTARY LEVEL													
Elementary Statistics: (no calculus prerequisite)		Report elementary statistics courses (no calculus prerequisite) in B1-1, B1-2 and B1-3 below.											
B1-1. Lecture with separately scheduled recit./problem sessions[a]													
B1-2. Other sections with enrollments of 35 or less													
B1-3. Other sections with enrollments above 35													
B2. Probability and Statistics (no calculus prerequisite)													
B3. Statistical Literacy/ Statistics and Society													
B4. Statistics for pre-service elementary or middle grades teachers													
B5. Statistics for pre-service high school teachers													
B6. All other elementary level statistics courses													

DO NOT LEAVE ANY UNSHADED BOX BLANK

Give the names of (up to) two examples of (B6) with the largest enrollments:

B6-1.

B6-2.

[a] Remember: An elementary statistics class along with its recitation/problem sessions is to be counted as one section.

[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is *NOT* physically present.

[c] Report only GTA's who teach a section independently.

B. Statistics Courses (Fall 2000) cont.

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	If not offered in Fall 2000, is it scheduled in Winter/Spring 2001? Y(es)/N(o) (4)
STATISTICS (CONT.)			
UPPER LEVEL			
B7. Mathematical Statistics (calculus prerequisite)			
B8. Probability (calculus prerequisite)			
B9. Stochastic Processes			
B10. Applied Statistical Analysis			
B11. Design and Analysis of Experiments			
B12. Regression (and Correlation)			
B13. Biostatistics			
B14. Nonparametric statistics			
B15. Categorical data analysis			
B16. Sample Survey design and analysis			
B17. Statistical software & computing			
B18. Data management			
B19. Senior Seminar/Independent Studies in Statistics			
B20. All other upper level statistics courses			

DO NOT LEAVE ANY UNSHADED BOX BLANK

Give the names of (up to) two examples of (B20) with the largest enrollments:

B20-1.

B20-2.

C. Computer Science Courses (Fall 2000)

Does your department offer any Computer Science courses?

Yes........................ ☐ (1) → if "yes" go to C1 (below).

No.......................... ☐ (2) → if "no" go to D (page 10).

Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[b] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)} Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[c] (8)
COMPUTER SCIENCE								
LOWER LEVEL								
C1. Computers and Society								
C2. Introduction to Software Packages								
C3. Issues in Computer Science								
C4. Computer Programming I (C 101 '91)[a]								
C5. Computer Programming II (C 102 '91)[a]								
C6. Advanced Programming & Data Structures								
C7. Database Management Systems								
C8. Discrete Mathematics for CS								
C9. All other lower level CS courses								

DO NOT LEAVE ANY UNSHADED BOX BLANK

[a] Refers to courses described in Computing Curriculum 1991, Report of the ACM/IEEE-CS Joint Curriculum Task Force, ACM 1991.

[b] At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is <u>*NOT*</u> physically present.

[c] Report only GTA's who teach a section independently.

Statistics Questionnaire

C. Computer Science Courses (Fall 2000) cont.

					Of the number in Column (4a), how many sections are taught by: {note: column (5)+(6)+(7)+(8)=(4a)}			
Name of Course (or equivalent) (1)	Total Enrollment Fall 2000 (2)	Total Number of Sections (3)	# from (3) taught by distance learning[a] (4)	Result when subtracting Column (3) minus Column (4) (4a)	Tenured or Tenure-eligible Faculty (5)	Other Full-time Faculty (6)	Part-time Faculty (7)	Graduate Teaching Assist.[b] (8)
COMPUTER SCIENCE								
MIDDLE LEVEL								
C10. Intro. to Computer Systems								
C11. Assembly Language Programming								
C12. Intro. to Computer Organization								
C13. Intro. to File Processing								
C14. All other middle level CS courses								
UPPER LEVEL								
C15. All upper level CS courses								

DO NOT LEAVE ANY UNSHADED BOX BLANK

a At least half of the students in the section receive the majority of their instruction via Internet, TV, or other method where the instructor is *NOT* physically present.

b Report only GTA's who teach a section independently.

D. Statistics Enrollments Outside Statistics Department (Fall 2000)

Officers of the American Statistical Association have asked that a question about statistics enrollments outside of statistics departments be included in this survey. It is likely that answering the following question will require data beyond what is normally available to statistics department chairs, and we hope that you will invest the extra time needed for an accurate response.

Instructions:

- List the enrollments in undergraduate statistics courses taught outside of the statistics department or program.
- Include only courses that are substantially statistics in content, regardless of title (please be as objective as possible).
- If you know that such courses do exist but cannot find a reasonable enrollment number to report, simply place a check mark in the appropriate box.

	DEPARTMENT OR DIVISION OFFERING COURSES IN FALL 2000						
COURSES	SCIENCE (1)	SOCIAL SCIENCE (2)	ENGINEERING (3)	BUSINESS (4)	EDUCATION (5)	OTHER (6)	**ROW TOTALS** (7)
D1. Introductory Statistics							
D2. Statistical Methods							
D3. **COLUMN TOTALS**							

DO NOT LEAVE ANY UNSHADED BOX BLANK

E. Impact of New Program in AP Statistics on Undergraduate Courses (Fall 2000)

To help us gauge the impact of the new program in AP Statistics on undergraduate courses in statistics, please answer the following questions:

E1. For Fall of 2000, how many students have been given credit for an introductory statistics course as a result of their score on the AP Statistics Examination?

Number of students given credit for AP Statistics Examination score……………………………………………… ☐

E2. Has your department introduced any new courses or course options as a result of the AP Statistics program?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

E3. Does your department offer an undergraduate statistics major?

Yes…………………….. ☐ (1) → if "yes" go to E4 (below).

No……………………… ☐ (2) → if "no" go to F (page 12).

E4. Has the number of your undergraduate majors in statistics increased since the 1997 inception of the AP Statistics program?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

F. Faculty Profile (Fall 2000)

F1. This question investigates the educational background of your full-time and part-time faculty.

Instructions:

- In columns (1)-(4), include all departmental faculty according to tenure or tenure-eligible status, distinguishing between such faculty on leave and not on leave.
- For full-time faculty members in your department with joint appointments, report them as *Tenured* or *Tenure-eligible* if that describes their status within your department; otherwise, report them as *Other Full-time* or *Part-time* according to their budget level within your department for Fall 2000.
- DO NOT report any GTA's in **any** of the tables in Section F.
- If your institution does not recognize tenure, please check the following box.. ☐ (1) and then report full-time faculty who are "permanent" in the *Tenured* column (distinguishing between those not on leave and on leave), and all other full-time faculty in the *Other Full-Time* column (without distinguishing between those not on leave and on leave), and report zero in columns 3 and 4.

HIGHEST DEGREE AND GENDER		TYPE OF APPOINTMENT						Row Totals
		TENURED		TENURE-ELIGIBLE		OTHER FULL-TIME	PART-TIME (NOT GTAs)	
		NOT ON LEAVE (1)	ON LEAVE (2)	NOT ON LEAVE (3)	ON LEAVE (4)	(5)	(6)	(7)
WITH DOCTORATE	MALE (1)							
	FEMALE (2)							
WITHOUT DOCTORATE	MALE (3)							
	FEMALE (4)							
COLUMN TOTALS	(5)							

GRAND TOTAL

DO NOT LEAVE ANY UNSHADED BOX BLANK

F. Faculty Profile (Fall 2000) cont.

F2. This question investigates the ethnic and gender status of your full-time and part-time faculty.

Instructions: Same as F1 (Note: Grand Total for F2 should equal Grand Total for F1.)

Ethnic/Racial Status and Gender			Type of Appointment: Tenured		Tenure-Eligible		Other Full-time	Part-time (not GTAs)	Row Totals
			Not on leave (1)	On leave (2)	Not on leave (3)	On leave (4)	(5)	(6)	(7)
American Indian, Eskimo, Aleut	Male	(1)							
	Female	(2)							
Asian, Pacific Islander	Male	(3)							
	Female	(4)							
Black or African American (non-Hispanic)	Male	(5)							
	Female	(6)							
Mexican American, Puerto Rican, or other Hispanic	Male	(7)							
	Female	(8)							
White (non-Hispanic)	Male	(9)							
	Female	(10)							
Status not known or Other	Male	(11)							
	Female	(12)							
Column Totals		(13)							

Grand Total

DO NOT LEAVE ANY UNSHADED BOX BLANK

F. Faculty Profile (Fall 2000) cont.

F3. For all faculty reported in the tenured and tenure-eligible columns of F1, report the number of faculty who belong to each of the age categories below. In case your institution does not recognize tenure, report your Permanent Full-Time faculty in the Tenured Faculty rows and exclude all other faculty, and report zeros in rows (3) and (4).

Note:

- If your institution recognizes tenure then the Grand Total in F3 should equal the sum of columns (1)-(4) in F1.
- If your institution does not recognize tenure then the Grand Total in F3 should equal the sum of columns (1) and (2) in F1.

FACULTY AGE		Under 30 (1)	30-34 (2)	35-39 (3)	40-44 (4)	45-49 (5)	50-54 (6)	55-59 (7)	60-64 (8)	65-69 (9)	70 & over (10)	Row Totals (11)
TENURED FACULTY	Male (1)											
	Female (2)											
TENURE-ELIGIBLE FACULTY	Male (3)											
	Female (4)											
COLUMN TOTALS	(5)											

DO NOT LEAVE ANY UNSHADED BOX BLANK

GRAND Total

F4. For the period from 01 September 1999 through 31 August 2000, please report the number of your tenured or tenure-eligible faculty who: [if your institution does not recognize tenure, report on those who are “permanent” full-time]

Died while in full-time service.. ______ (1)

Left full-time service due to retirement....................................... ______ (2)

F. Faculty Profile (Fall 2000) cont.

F5. Does your organization offer a "transition to retirement program" in which faculty agree to retire at a fixed future date and gradually reduce their teaching assignments until that time?

Yes.......................... ☐ (1)

No........................... ☐ (2)

G. Departmental Information (Fall 2000)

G1. For Fall 2000, what is the expected (or typical) teaching load for the <u>tenured or tenure-eligible</u> faculty (those reported in F3 on the previous page)? [If your institution does not recognize tenure, report on those who are "permanent full-time".]

Expected classroom contact hours per week... ☐

G2. Does your department offer an undergraduate major?

Yes.......................... ☐ (1) ⟶ if "yes" go to G3 (below).

No........................... ☐ (2) ⟶ if "no" go to H1 (page 17).

G3. Please report the number of your departmental majors who where awarded a baccalaureate degree by your institution, between 01 July 1999 and 30 June 2000 (include double majors).

Number of baccalaureate degrees awarded to majors in your department.. ☐

G. Departmental Information (Fall 2000) cont.

G4. Of the number of degrees awarded above (G3), please report the number who majored in each of the following categories. [Be sure to report each graduating student only once. Use the "Other" category for any major that does not fit the existing categories.]

- Note: Grand Total should equal the figure given in G3.

AREA OF MAJOR	Male (1)	Female (2)	Row Totals (3)
1. STATISTICS			
2. BIOSTATISTICS			
3. ACTUARIAL SCIENCE			
4. JOINT COMPUTER SCIENCE AND STATISTICS			
5. JOINT MATHEMATICS AND STATISTICS			
6. STATISTICS EDUCATION			
7. OTHER TRACKS IN YOUR DEPARTMENT			
8. **COLUMN TOTALS**			
			GRAND TOTAL

DO NOT LEAVE ANY UNSHADED BOX BLANK

H. Faculty Teaching Statistics (Fall 2000)

H1. During Fall 2000, how many different faculty members are teaching the statistics courses that you reported in Section B (pages 6-7)?

Number of different faculty members.......................... [ ]

H2. Of the faculty members reported in Question H1, how many had a masters degree in statistics or biostatistics, or a doctoral degree in statistics or biostatistics, as of 01 September 2000?

Number with a doctoral degree in statistics/biostatistics.......................... [ ] (1)

Number with a masters degree, but not a doctoral degree, in statistics/biostatistics.......................... [ ] (2)

H3. For the faculty members teaching statistics courses (figure given in Question H1), what are the major fields of study for their highest earned degree? Complete the following table showing the number of faculty belonging in each box.

	MAJOR FIELD OF HIGHEST DEGREE							
HIGHEST DEGREE	STATISTICS (1)	BIOSTATISTICS (2)	MATHEMATICS (3)	MATHEMATICS EDUCATION (4)	COMPUTER SCIENCE (5)	SOCIAL SCIENCE (6)	EDUCATION (7)	OTHER (8)
DOCTORATE (1)								
MASTERS (2)								
OTHER (3)								

DO NOT LEAVE ANY UNSHADED BOX BLANK

Statistics Questionnaire

I. Academic Support and Enrichment (Fall 2000)

I1. Does your department or university offer a statistics placement test for entering freshmen?

Yes…………………….. ☐ (1) ⟶ if "yes" go to I2 (below).

No……………………… ☐ (2) ⟶ if "no" go to I7 (page 19).

I2. Is the placement examination required for entering freshmen?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

I3. What is the source of the placement test(s)? (Check all that apply.)

Test written by department…………………………………………………… ☐ (1)

Test provided by Educational Testing Service (ETS)……………………… ☐ (2)

Test provided by American College Testing Program (ACT)…………….. ☐ (3)

Test provided by Mathematical Association of America (MAA)…………… ☐ (4)

Other test provided by external source……………………………………. ☐ (5)
(please specify) ____

I4. Is it *required* that entering freshmen discuss the results of the placement test with an advisor before registering for their first statistics course?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

I5. Does the placement examination lead to mandatory placement in the students' first statistics course?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

Statistics Questionnaire

I. Academic Support and Enrichment (Fall 2000) cont.

I6. Does your department periodically assess the effectiveness of the statistics placement test?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

I7. Does your college operate a statistics tutoring center?

Yes…………………….. ☐ (1) → if "yes" go to I8 (below).

No……………………… ☐ (2) → if "no" go to I9 (page 20).

I8. Please check all services available to students through your statistics tutoring center. (Check all that apply.)

Computer-aided instruction……………………………………………… ☐ (1)

Computer software such as computer algebra packages or statistical packages……………………………………… ☐ (2)

Media such as video tapes……………………………………………… ☐ (3)

Tutoring by students…………………………………………………… ☐ (4)

Tutoring by paraprofessional staff……………………………………… ☐ (5)

Tutoring by part-time statistics faculty………………………………… ☐ (6)

Tutoring by full-time statistics faculty………………………………… ☐ (7)

Internet resources……………………………………………………... ☐ (8)

Other lab or center services (please specify) ______________________________ ☐ (9)

I. Academic Support and Enrichment (Fall 2000) cont.

I9. Please check the opportunities available to your undergraduate statistics students. (Check all that apply.)

- Honors sections of statistics courses……… ☐ (1)
- Statistics club……… ☐ (2)
- Special statistics programs to encourage women……… ☐ (3)
- Special statistics programs to encourage minorities……… ☐ (4)
- Opportunities to compete in statistics contests……… ☐ (5)
- Special statistics lectures/colloquium, not part of a statistics club……… ☐ (6)
- Statistics outreach opportunities to local K-12 schools……… ☐ (7)
- Opportunities to participate in undergraduate research in statistics……… ☐ (8)
- Independent studies opportunities in statistics……… ☐ (9)
- Assigned faculty advisors in statistics……… ☐ (10)

J. Pre-service Education of Elementary and Middle School Teachers (Fall 2000)

J1. Does your institution offer a program or major leading to certification as a teacher in some or all grades K-8?

Yes……… ☐ (1) → if "yes" go to J2 (below).

No……… ☐ (2) → if "no" go to K1 (page 22).

J2. Do members of your department serve on a committee that determines what statistics courses are part of that certification program?

Yes……… ☐ (1)

No……… ☐ (2)

Statistics Questionnaire

J. Pre-service Education of Elementary and Middle School Teachers (Fall 2000) (cont.)

J3. Does your department offer a statistics course or course sequence, designed specifically for pre-service K-8 teachers?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

J4. Are special sections of some of your regular statistics courses (those not in J3) designated for pre-service K-8 teachers?

Yes…………………….. ☐ (1)

No……………………… ☐ (2)

J5. Because states have different certification requirements for teachers at different levels and because the K-8 grades are grouped together differently in different states, the next questions ask separately about students preparing to teach in early grades (1-3) and later grades (including 5 and 6).

Including general education requirements, how many courses are pre-service teachers <u>required</u> to take <u>in your department</u>:

For early grade certification (grades 1-3)……………………………..…………… ☐ (1)

For later grade certification (including grades 5 and 6)…………………………. ☐ (2)

J6. In your judgement, which three of the following courses in your department are <u>most likely</u> to be taken by K-8 pre-service teachers? (Note: A total of 6 boxes should be checked, 3 in <u>each</u> column.)

	For Early Grade Certification	For Later Grade Certification
A multiple-term course designed for elementary education students……………	☐ (1)	☐ (2)
A single-term course designed for elementary education students……………..	☐ (3)	☐ (4)
Introductory statistics/elementary statistics (in line B1)…………………………..	☐ (5)	☐ (6)
Probability and statistics (in line B2)………………………………………………	☐ (7)	☐ (8)
Statistical literacy/statistics and society (in line B3)……………………………….	☐ (9)	☐ (10)

K. Comments and Suggestions

K1. Amount of time required to complete this questionnaire was _____________ (hours).

K2. Suggestions for changes to the questionnaire (for CBMS2005):

Appendix VII

Tables of Standard Errors

STANDARD ERROR TABLE 1.1 Standard error figures for Chapter 1 Tables SE.1, SE.2, SE.3, SE.4, SF.6, SF.7, SF.8, SF.9, SF.10, SF.11, SF.12, and SF.13, showing table entries: Fall 2000.

	Four-Year	SE	Two-Year	SE
TABLE SE.1				
Mathematics	1614	55	1273	38
Statistics	245	14	74	5
CS	124	20	39	11
Total	1984	63	1386	42

	Four-Year	SE	Two-year	SE
TABLE SE.2	Number		Number	
Semester	1329	47	981	17
Four-1-four	75	42	0	0
Trimester	21	13	2	1
Quarter	53	15	66	16
Other	12	11	4	2

TABLE SE.4	Bachelors Degrees	SE
See E.1		
Mathematics	10759	992
Math Education	4991	1334
Statistics	502	68
Actuarial	425	90
OR	43	21
Math & CS	876	250
Math & Stat	196	101
Other	1507	469
Total	19299	2053
Total, women	9017	1257

TABLE SF.6	Number	SE
See F.1, F.2 & F.3		
T&TE, M & S	16342	637
OFT, M & S	3687	251
TYC Perm FT	6960	218
TYC Temp FT	961	231
Total, Perm Fac.	23302	673
Total, Temp Fac.	4648	341

TABLE SE.3	See E.2 & TYR.4
TABLE SF.7	See TYR.20
TABLE SF.8	See F.2 & F.3
TABLE SF.9	See F.4 & TYR.32
TABLE SF.10	See F.5
TABLE SF.11	See F.6
TABLE SF.12	See F.7
TABLE SF.13	See F.1, F.2, F.3 & TYR.17

STANDARD ERROR TABLE 1.2 Standard error (SE) figures for Chapter 1 Table SE.5 (percentage availability of certain upper division courses): Fall 2000.

Table SE.5	All Math depts 2000-01	SE	PhD Math	SE	MA Math	SE	BA Math	SE	All Stat depts 2000-01	SE	PhD Stat	SE	MA Stat	SE
Upper level Math														
Modern Algebra	71	5	87	4	88	6	63	7						
Real Analysis	56	5	90	3	77	8	45	7						
Geometry	56	5	75	5	88	4	46	7						
Topology	22	4	61	5	32	8	13	5						
Number theory	33	4	63	5	57	9	23	5						
Combinatorics	18	3	48	5	24	8	11	4						
Applied Math/Mod	24	3	51	6	51	8	13	4						
Intro to OR	13	3	14	4	26	8	10	3						
Foundations/Logic	16	4	23	4	31	6	12	5						
Math sec tchrs	42	5	39	5	64	8	37	7						
Math senior sem/Indep study	58	5	57	5	62	9	58	7						
Upper level Stat														
Math Statistics	52	5	53	5	72	9	47	7	90	2	93	2	75	10
Probability	40	5	57	6	63	9	31	6	75	4	81	4	50	12
Stochastic proc	6	1	29	5	9	4	1	0.6	46	5	54	6	13	8
Appl stat analysis	13	2	27	5	42	9	4	1	72	4	74	4	63	11
Exp design	10	2	21	5	20	5	5	3	74	4	76	4	63	11
Regression & Correl	9	2	22	5	24	8	3	2	82	4	86	4	63	11
Biostatistics	5	2	7	3	2	2	5	3	20	4	19	4	25	10
Nonparamet Stat	4	1	14	4	7	4	1	0.7	45	5	43	5	50	12
Categ data analysis	1	0.5	9	3	2	1.5	0	0	39	5	44	5	13	8
Sample survey design	3	1	10	3	11	4	0	0	52	5	50	5	63	11
Stat software & computing	5	1	21	5	13	7	1	0.6	48	5	45	6	63	11
Data management	1	0.4	4	2	2	1.6	0	0	13	3	16	4	0	0
Stat senior sem/Indep study	5	1	15	4	14	5	2	1	34	5	36	5	25	10

STANDARD ERROR TABLE 1.3 Standard error (SE) figures for Chapter 1 Tables SF.14, SF.15, and SF.16: Fall 2000.

Table SF.14	Asian	Black	Hispanic	White	Unknown	
Math PT men	2	2	2	53	1	--
SE	0.6	0.4	1.5	3	0.6	--
Math PT women	1	1	1	37	1	--
SE	0.4	0.4	0.6	2	0.3	--
Stat PT men	17	0	2	48	0	--
SE	3	0	1	4	0	--
Stat PT women	6	0	2	27	0	--
SE	1	0	1	4	0	--
Table SF.15	PhD Math	MA Math	BA Math	All Math	All Stat	All TYC
Died & Retired	174	165	123	462	16	163
SE	19	36	36	58	3	23
Table SF.16	<6 hrs	6 hrs	7 to 8 hrs	9 to 11 hrs	12 hrs	>12 hrs
Math PhD	14	56	17	6	6	2
SE	4	6	4	3	3	2
Math MA	2	0	6	44	46	2
SE	1.6	0	3	9	9	2
Math BA	0	1	3	23	63	10
SE	0	1	3	6	7	4
Stat PhD	34	63	2	0	0	0
SE	6	6	1	0	0	0
Stat MA	14	57	0	0	29	0
SE	9	12	0	0	12	0

STANDARD ERROR TABLE 2.1 Standard error (SE) figures for Chapter 2 Tables PSE.1, PSE.2, PSE.3, PSE.4, PSE.5, and PSE.6: Fall 2000.

	Table PSE.1		**Table PSE.2**					
	Certif program	SE	Committee	SE	Special seq	SE	Special sections	SE
Math PhD	72	5	63	6	79	5	11	4
Math MA	87	9	74	9	92	4	13	5
Math BA	85	9	68	7	73	6	4	2
All Math Depts	84	4	69	5	77	5	7	2
Stat PhD	58	5	0	0	4	2	0	0
Stat MA	63	11	0	0	0	0	0	0
All Stat Depts	58	5	0	0	0	0	0	0
Table PSE.3								
Two-year Colleges	Coordinator	SE	Special seq	SE	Special sections	SE	--	--
	22	3	49	7	15	7	--	--

Table PSE.4							
# Req'd Courses	Early grades	SE	Later grades	SE	Type of Dept	Avg #, early grades	Avg #, later grades
0 Req	8	3	7	3	PhD Math	2.2	2.5
1 Req	17	5	12	4	SE-PhD	0.2	0.3
2 Req	45	6	42	5	MA Math	3.3	4.1
3 Req	14	4	12	4	SE-MA	0.5	0.9
4 Req	11	4	10	4	BA Math	2.3	2.8
5 or more	6	3	18	4	SE-BA	0.3	0.3
					All Math Depts	2.4	3.0
					SE-All Math	0.2	0.3

Table PSE.5	All Math Depts				**Table PSE.6**	Stat Depts	
Most frequent	Early grades	SE	Later grades	SE	Early Grades		SE
Multi-term	48	6	46	6	Multi-term	5	4
Single term	32	5	27	5	Single term	26	6
College algebra	42	5	34	5	Elem statistics	63	6
Pre-calculus	14	4	21	5	Prob & Stat	16	4
Math modeling	4	2	5	3	Stat Literacy	33	6
Math/Lib Arts	39	6	33	5	Later Grades		
Finite Math	20	5	20	5	Multi-term	5	4
Math history	5	2	9	3	Single term	21	6
Calculus	17	5	29	6	Elem statistics	68	6
Geometry	8	2	17	4	Prob & Stat	8	1
Elem statistics	28	5	28	5	Stat Literacy	29	6

STANDARD ERROR TABLE 2.2 Standard error (SE) figures for Chapter 2 Tables AR.7, AR.8, AR.9, and AR.10: Fall 2000.

Table AR.7	Placement Tests	SE	Required	SE	**Table AR.8**	Discuss	SE	Mandatory	SE	Assess tests	SE
TYC	98	1	98	1	TYC	79	7	67	7	85	3
PhD Math	81	5	56	6	PhD Math	54	6	43	6	91	4
MA Math	83	7	58	8	MA Math	60	7	57	10	98	2
BA Math	66	7	45	7	BA Math	62	8	46	9	83	7
All Math	70	5	49	5	All Math	60	5	47	6	87	5
PhD Stat	11	3	2	0.6	PhD Stat	53	15	34	17	0	0
MA Stat	0	0	0	0	MA Stat	0	0	0	0	0	0
All Stat	9	2	2	0.5	All Stat	53	15	34	17	0	0
Table AR.9	TYC	SE	Math PhD	SE	Math - MA	SE	Math BA	SE	All Math	SE	
Department	99	0.6	100	0	100	0	100	0	100	0	
ETS	30	7	6	3	5	3	2	1	3	1	
ACT	34	3	14	5	21	8	12	6	14	5	
MAA	3	2	21	5	39	10	18	7	23	5	
Other	26	3	13	4	18	5	5	2	9	2	
Table AR.10	Math	SE	Stat	SE	TYC	SE					
PhD	90	3	61	5	--	--					
MA	95	3	50	12	--	--					
BA	88	5	--	--	--	--					
All	89	3	59	5	98	1					

STANDARD ERROR TABLE 2.3 Standard error (SE) figures for Chapter 2 Tables AR.11 and AR.12: Fall 2000.

Table AR.11	All Math Depts	SE	All Stat Depts	SE	TYCs	SE	**Table AR.12**	TYCs	SE	All Math Detps	SE	All Stat Depts	SE
CAI	38	6	36	6	68	2	Honors	20	3	29	4	46	5
Software	62	6	63	6	69	2	Club	14	2	61	5	25	4
Media	24	4	17	5	74	7	Womens' Programs	4	1	9	2	2	1.5
Student tutors	99	0.4	93	3	96	1	Minority Programs	4	1	7	1	2	1
Paraprofess tutors	35	5	37	6	68	7	Contests	28	3	63	5	28	4
PT faculty tutors	18	4	11	4	48	7	Colloquia	9	2	54	5	41	5
FT faculty tutors	16	3	3	0.8	42	7	Outreach	20	3	47	5	7	3
Internet	33	5	23	5	53	3	Undergrad Res Oppor	4	1	59	5	58	5
							Indep study	25	3	60	4	67	4
							Advisors in Dept	33	7	82	4	71	5

STANDARD ERROR TABLE 2.4 Standard error (SE) figures for Chapter 2 Table DL.13: Fall 2000.

Table DL.13	% of sctns	SE		% of sctns	SE
Arithmetic	0.7	0.2	Elem statistics	5.7	1.2
Pre-algebra	1.3	0.4	Probability	2	1.3
Elem algebra (HS level)	1.4	0.3	Finite mathematics	2.6	2
Intermedi alg (HS level)	1.4	0.3	Math/liberal arts	5.1	1
Geometry (HS level)	4.9	2	Math elem school teachers	1.3	0.8
College algebra	6.6	1.7	Business math (NT)	4.9	2.1
Trigonometry	0.7	0.3	Business math (T)	0	0
Coll algebra & trig	2.9	1.7	Technical math	0	0
Intro math mod	0.9	0.8	Other math courses	4.7	1.9
Precalculus	1.5	0.6	Computers and society	0	0
Mainstream Calculus I	1.5	0.5	Introduction to software	6.4	4
Mainstream Calculus II	2.4	1.2	Issues in CS	0	0
Mainstream Calculus III	1	0.6	Computer prog I	0	0
Non-mnstrm Calculus I	3	1.5	Computer prog II	3.1	2.5
Non-mnstrm Calculus II	19.4	16	Adv prog & data str	0	0
Diff eqns	1.5	1.2	Database mgmt	6.3	3.7
Linear algebra	3.7	2.3	Discrete math for CS	0	0
Discrete math	0	0	Other CS	2.8	0.9

STANDARD ERROR TABLE 2.5 Standard error (SE) figures for Chapter 2 Tables DL.14 and DL.15: Fall 2000.

Table DL.14	All Math Depts % of Sections	SE		All Math Depts % of Sections	SE
Arithmetic	0	0	Non-mainstrm Calculus I	0.8	0.5
General math	0	0	Non-mainstrm Calculus II	0	0
Elem alg (HS level)	0.9	9.6	Differential equations	0.3	0.3
Intermed alg (HS level)	2	0.9	Discrete mathematics	0	0
Other remedial	1.4	1.2	Linear/Matrix algebra	0	0
Introductory level			Other Calc level courses	0	0
College alg	1.3	0.4	Statistics Courses		
Trigonometry	3.2	2.3	Elem statistics	1.6	0.6
College alg & trig	0.1	0	Prob & Stat	0	0
Elem functions	0.4	0.2	Other elem stat	0	0
Intro to math mod	0	0			
Math/lib arts	1.2	0.9	Computers & society	0	0
Finite math	2.4	1.5	Intro to software pkgs	4.5	3.2
Business math	0	0	Issues in CS	0	0
Math for elem teachers	1	0.6	Computer prog I	0.6	0.5
Other introductory	0.6	0.4	Computer prog II	1.7	1.4
Calculus Level			Adv prog & data str	6.6	4.7
Mainstream Calculus I	0.3	0.2	Database mgmt	17.2	12
Mainstream Calculus II	0.5	0.2	Discrete math for CS	0	0
Mainstream Calculus III, IV	1.1	0.5	Other lower level CS	4.7	2.7
Table DL.15					
Statistics Departments	All Stat depts	SE			
Elementary Level Courses					
Elementary statistics	0.3	0.2			
Probability & Statistics	0	0			
Statistics literacy	3.3	2.3			
Stat/elem teachers	0	0			
Other elem level stat	0	0			

STANDARD ERROR TABLE 2.6 Standard error (SE) figures for Chapter 2 Tables DEN.16, DEN.17, and DEN.18 (concerning dual enrollment): Fall 2000.

Table DEN.16	Spr 2000	Fall 2000	# Sections	**Table DEN.17**	Never	Sometimes	Always
College Algebra	522	924	6619	Textbook	10	12	79
SE	133	211	454	SE	4	5	6
Precalculus	510	362	1991	Syllabus	8	11	82
SE	169	117	191	SE	3	4	5
Intro Math Model	10	0	329	Final Exam	15	28	57
SE	9	0	159	SE	5	6	7
Calculus I[1]	347	440	3026[1]	Instructor	19	20	61
SE	69	82	137[1]	SE	6	6	7
Elementary Statistics	179	190	2794				
SE	45	48	193				

Table DEN.18	Percent	SE
Degree Requirments	92	4
Teaching Eval	67	7

[1] The number of calculus I sections is the sum of mainstream and non-mainstream Calculus I courses in Table TYR.10, and the SE figure is estimated from the separate SE figures given in the Standard Error Table for TYR.10.

STANDARD ERROR TABLE 2.7 Standard error (SE) figures for Chapter 2 Tables ST.19 and ST.20: Fall 2000.

Table ST.19	PhD Stat or Biostat Dept	SE	MA Stat or Biostat Dept	SE	Other	SE				
Math PhD	50	6	9	2	41	--				
Math MA	30	6	12	9	58	--				
Math BA	16	3	11	3	73	--				
Stat PhD	83	2	8	1	9	--				
Stat MA	67	7	17	2	16	--				
Table ST.20	PhD Math Dept	SE	MA Math Dept	SE	BA Math Dept	SE	PhD Stat Dept	SE	MA Stat Dept	SE
Stat PhD	50	4	36	7	12	2	82	2	56	9
Stat MA only	6	1	6	2	7	2	5	1	15	2
Biostat PhD	2	1	2	1	0	0	1	0.4	6	3
Biostat MA only	0	0	0	0	1	1	1	0.3	2	1.3
Math PhD	22	4	28	4	31	4	6	1	10	5
Math MA only	6	2	12	3	18	3	0	0.4	2	1.3
Math Ed PhD	1	0.4	3	1	10	3	0	0.3	0	0
Math Ed MA	1	0.5	1	0.6	8	4	0	0	0	0
CS PhD	0	0.2	0	0	1	0.4	0	0	0	0
CS MA only	0	0	1	0.5	0	0.4	0	0	0	0
Soc Sci PhD	0	0	0	0	2	1.5	1	0.7	2	1.5
Soc Sci MA only	0	0	0	0	0	0	0	0	0	0
Education PhD	0	0	0	0	0	0	0	0.8	0	0
Ed MA only	0	0	0	0	1	0.5	0	0	0	0
Other PhD	6	3	7	5	2	1	1	0.3	2	1.3
Other MA only	2	1	1	1	2	1.3	0	0.1	2	1.7

STANDARD ERROR TABLE 3.1 Standard error (SE) for Chapter 3 Table E.1 (Bachelors degrees): Fall 2000.

Table E.1	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts	Total Math & Stat Depts
Math Men	2851	1340	3742	7933				7933
SE - Math Men	273	144	524	603				603
Math Women	1703	886	3142	5731				5731
SE - Math Women	159	119	591	618				618
Total Math Degrees	4554	2226	6884	13664				13664
SE - Total Math	413	221	995	1088				1088
Math Ed Men	274	562	1187	2023				2023
SE - Math Ed Men	68	144	478	504				504
Math Ed Women	414	928	1626	2968				2968
SE - Math Ed Women	102	228	820	855				855
Total Math Ed Degrees	688	1490	2813	4991				4991
SE - Total Math Ed	167	331	1286	1334				1334
Stat Men	36	43	24	103	161	62	223	326
SE - Stat Men	17	17	15	28	22	26	34	44
Stat Women	48	65	34	147	139	32	171	318
SE - Stat Women	15	38	34	46	17	9	19	50
Total Stat Degrees	84	108	58	250	300	94	394	644
SE - Total Stat	30	51	25	64	36	33	49	81
CS Men	146	1189	1172	2507				2507
SE - CS Men	75	416	324	530				530
CS Women	41	322	445	808				808
SE - CS Women	18	134	143	195				195
Total CS Degrees	187	1511	1617	3315				3315
SE - Total CS	92	525	453	696				696
Total Degrees Men	3307	3134	6125	12566	161	62	223	12789
SE - Total Deg Men	279	494	870	1019	22	26	34	1020
Total Degrees Women	2206	2201	5247	9654	139	32	171	9825
SE - Total Deg Women	163	313	1239	1276	17	9	19	1276
Total All Degrees	5513	5335	11372	22220	300	94	394	22614
SE - Tot All Degrees	415	729	2037	2165	36	34	50	2166

STANDARD ERROR TABLE 3.2 Standard errors (SE) for Chapter 2 Table E.2 (enrollment in 1000s): Fall 2000.

	Mathematics Departments				Statistics Departments		
Table E.2	Univ (PhD)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts
Faculty Number	6702	5002	7303	19007	875	146	1021
SE	289	288	610	688	34	9	36
Remedial Math	59	59	101	219			
SE	11	11	21	26			
Introductory Math	258	227	238	723			
SE	20	17	20	33			
Calculus level	302	131	137	570			
SE	16	15	12	25			
Advanced Math	43	24	35	102			
SE	2	2	6	7			
Total Mathematics	662	441	511	1614			
SE	32	26	39	55			
Elementary Stat	38	35	63	136	46	8	54
SE	6	6	9	12	2	2	3
Upper level Stat	12	12	11	35	17	3	20
SE	2	3	1	3	1	1	2
Total Statistics	50	47	74	171	63	11	74
SE	7	7	9	14	3	2	3
Lower CS	5	33	52	90	0	1	1
SE	1	11	12	16	0	0.4	0.4
Middle CS	1	7	9	17			
SE	0.3	2	3	3			
Upper CS	2	6	8	16			
SE	1	2	2	3			
Total CS courses	8	46	69	123	0	1	1
SE	3	15	14	20			
Total all courses	720	534	654	1908	63	12	75
SE	33	34	46	62	3	2	3

STANDARD ERROR TABLE 3.3 Standard error (SE) figures for Chapter 3 Table E.10 (Number of Sections): Fall 2000.

	Number of sections: Fall 2000						
	Mathematics Departments				Statistics Departments		
Table E.10	Univ (Phd)	Univ (MA)	Coll (BA)	Total Math Depts	Univ (PhD)	Univ (MA)	Total Stat Depts
Remedial Math	1493	1772	4388	7653			
SE	281	333	992	1081			
Introductory Math	5032	6506	8987	20525			
SE	420	496	712	924			
Calculus Level	6768	4551	6438	17757			
SE	362	484	505	770			
Advanced Math	2392	1936	3415	7743			
SE	138	142	426	458			
Total Math Courses	15685	14765	23228	53678			
SE	826	881	1576	1884			
Elementary Stat	827	1064	2372	4263	786	123	909
SE	148	163	315	378	57	22	61
Upper Level Stat	580	638	728	1946	476	122	598
SE	81	89	84	146	34	20	39
Total Stat Courses	1407	1702	3100	6209	1262	245	1507
SE	213	217	346	454	62	33	70
Lower Level CS	92	1553	2557	4202	4	12	16
SE	30	552	495	710	2	7	8
Middle Level CS	24	465	590	1079	0	2	2
SE	11	132	153	179	0	1	1
Upper Level CS	98	527	868	1493	0	8	8
SE	45	148	272	311	0	5	5
Total CS courses	214	2545	4015	6774	4	22	26
SE	81	749	72	168	2	13	13
Total all courses	17306	19012	30343	66661	1266	267	1533
SE	930	1315	2027	2367	63	37	73

STANDARD ERROR TABLE 3.4 Standard error (SE) figures for Chapter 3 Table E.11 (Average section size): Fall 2000.

	Average Section size Fall 2000					
	Mathematics Depts			Statistics Depts		
Table E.11	Univ (PhD)	Univ (MA)	Coll (BA)	Univ (PhD)	Univ (MA)	All Depts
Remedial Math	39	33	23			29
SE	3	1	2			2
Introductory Math	51	35	26			35
SE	3	1	1			1
Calculus Level	45	29	21			32
SE	2	1	1			1
Advanced Mathematics	18	12	10			13
SE	1	1	1			1
Elementary Statistics	46	33	27	58	65	37
SE	4	2	1	4	10	1
Advanced Statistics	21	19	15	36	25	22
SE	3	2	1	3	3	1
Lower Level CS	50	21	20	13	58	22
SE	5	3	2	0	0	1
Middle Level CS	39	16	16		90	22
SE	9	2	2		0	1
Upper Level CS	21	12	10		30	11
SE	5	3	2		0	2

STANDARD ERROR TABLE 3.5 Standard error (SE) figures for Chapter 3 Table E.12 (Percentage of sections taught by various kinds of faculty): Fall 2000.

	Percentage of Mathematics sections taught by					No. of	Percentage of Statistics sections taught by					No. of	Percentage of CS sections taught by					No. of
Table E.12	T/TE	OFT	PT	GTAs	Ukn	Math sctns	T/TE	OFT	PT	GTAs	Ukn	Stat sctns	T/TE	OFT	PT	GTAs	Ukn	CS sctns
Math PhD	42	16	17	21	4	15685	63	9	11	14	3	1407	59	17	6	3	15	214
SE	1	2	2	1	0.6	826	3	3	2	3	0.4	213	8	7	2	1	8	81
Math MA	48	19	22	5	6	14765	72	9	11	1	7	1702	47	11	35	0	7	2545
SE	3	2	2	1	1	881	4	4	2	0.5	3	217	9	2	8	0	0	749
Math BA	60	13	21	0	6	23228	59	13	22	0	6	3100	56	18	15	0	11	4015
SE	2	2	2	0.1	1	1576	6	3	5	0	2	346	7	4	5	0	4	774
Total Math Depts	52	15	20	7	6	53678	63	11	17	4	5	6209	53	15	22	0	10	6774
SE	1	1	1	0.5	0.8	1884	3	2	3	0.9	1	454	6	3	5	0	4	1045
Stat PhD							53	8	14	20	5	1262						
SE							3	1	3	2	1	62						
Stat MA							71	9	5	4	12	245						
SE							7	1	1	2	6	33						
Total Stat Depts							56	8	12	18	6	1507						
SE							3	1	3	2	2	70						

STANDARD ERROR TABLE 4.1 Standard error (SE) for Chapter 4 Table F.1 (number of tenured, tenure-eligible (TE), other full-time (OFT) and part-time (PT) faculty in Mathematics and Statistics Departments by gender): Fall 2000.

	Univ (PhD)				Univ (MA)				Coll (BA)				
Table F.1	Ten'd	TE	OFT	PT	Ten'd	TE	OFT	PT	Ten'd	TE	OFT	PT	Total
Math Depts													
Doctoral	4693	803	685	408	2847	848	186	349	3792	1292	497	622	17022
SE	211	57	80	61	209	105	41	77	355	168	128	104	576
Doctoral Women	346	177	166	87	544	250	34	103	761	496	137	144	3245
SE	31	22	26	15	63	56	14	30	105	95	42	45	204
Non-doctoral	25	0	497	868	223	14	883	2088	755	179	788	2826	9146
SE	9	0	76	140	62	13	122	340	238	85	130	403	658
Non-doctoral Women	13	0	288	438	62	0	567	824	316	35	481	1257	4281
SE	7	0	50	75	25	0	93	123	162	26	94	207	351
Total Math	4718	803	1182	1276	3070	862	1069	2437	4547	1471	1285	3448	26168
SE	212	57	116	158	223	104	125	381	453	202	188	444	880
Total Math Women	359	177	454	525	606	250	601	927	1077	531	618	1401	7526
SE	32	22	60	79	69	56	93	131	198	96	98	216	387
Stat Depts													
Doctoral	612	138	105	60	87	21	9	12					1044
SE	26	9	15	8	5	3	2	3					35
Doctoral Women	49	47	34	15	12	5	0	3					165
SE	5	5	5	3	2	1	0	1					9
Non-doctoral	0	0	20	15	11	2	17	3					68
SE	0	0	4	4	5	1	4	2					6
Non-doctoral Women	0	0	14	10	5	2	11	0					42
SE	0	0	2	3	3	1	4	0					6
Total Stat	612	138	125	75	98	23	26	15					1112
SE	26	9	15	9	5	3	5	4					37
Total Stat Women	49	47	48	25	17	7	11	3					207
SE	5	5	6	4	4	1	4	1					11

STANDARD ERROR TABLE 4.2 Standard error (SE) figures for Chapter 4 Table F.2 (number of tenured, tenure-eligible (TE), other full-time (OFT), and part-time (PT) faculty in Mathematics Departments by gender and type of school): Fall 2000.

	Univ (PhD)				Univ (MA)				Coll (BA)				Total				
Table F.2	Ten'd	TE	OFT	PT	Ten'd	TE	OFT	PT	Ten'd	TE	OFT	PT	Ten'd	TE	OFT	PT	Total
Men	4359	626	728	751	2464	612	468	1510	3470	940	667	2047	10293	2178	1863	4308	18642
SE	199	47	69	102	192	71	74	273	311	172	138	312	396	191	170	413	661
Women	359	177	454	525	606	250	601	927	1077	531	618	1401	2042	958	1673	2853	7526
SE	32	22	60	79	69	56	93	130	198	96	98	216	208	113	148	258	387
Total	4718	803	1182	1276	3070	862	1069	2437	4547	1471	1285	3448	12335	3136	3536	7161	26168
SE	212	57	116	158	223	104	125	381	453	202	188	444	519	234	250	583	880

STANDARD ERROR TABLE 4.3 Standard error (SE) figures for Chapter 4 Table F.3 (Number of tenured, tenure-eligible (TE), other full-time (OFT), and part-time (PT) faculty in Statistics Departments by gender and type of school): Fall 2000.

	Univ (PhD)				Univ (MA)				Total				
Table F.3	Ten'd	TE	OFT	PT	Ten'd	TE	OFT	PT	Ten'd	TE	OFT	PT	Total
Men	563	91	77	50	81	16	15	12	644	107	92	62	905
SE	24	8	10	7	5	2	3	4	25	8	11	8	32
Women	49	47	48	25	17	7	11	3	66	54	59	28	207
SE	5	5	6	4	4	1	4	1	7	6	7	4	11
Total	612	138	125	75	98	23	26	15	710	161	151	90	1112
SE	26	9	15	9	5	3	5	4	27	10	15	10	37

STANDARD ERROR TABLE 4.4 Standard error (SE) figures for certain faculty age percentages from Chapter 4 Tables F.4 and F.5 for Mathematics and Statistics Departments, respectively: Fall 2000.

	<30	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	>69	Avg. age
Table F.4: Math Depts											
Total Univ (PhD)	1	6	11	12	16	15	16	14	6	2	50
SE	0.2	0.6	0.8	0.7	0.8	0.9	1	0.6	0.5	0.3	0.3
Total Univ (MA)	2	7	13	16	13	13	18	13	3	2	49.1
SE	0.5	1.4	1.9	1.8	1.6	1.2	2.2	1.2	0.7	0.7	0.7
Total Coll (BA)	3	12	11	12	14	15	19	10	2	1	47.9
SE	0.9	2.4	1.8	1.9	1.9	1.9	2.2	1.7	0.9	0.6	0.6
Total All Math	2	9	12	13	14	15	18	12	4	2	49
SE	0.4	1	0.9	0.9	0.9	0.9	1.1	0.7	0.4	0.3	0.3
Table F.5: Stat Depts											
Total Univ (PhD)	4	11	9	14	16	13	15	11	4	3	48.2
SE	0.6	0.9	0.9	1.2	1.1	0.9	1	0.8	0.6	0.5	0.4
Total Univ (MA)	3	6	11	12	17	22	19	9	0	1	48.7
SE	1.1	1	2.1	4.3	3.6	2.8	4	1.6	0	0.8	0.7
Total All Stat	4	10	10	13	16	14	16	10	3	3	48.2
SE	0.5	0.8	0.8	1.2	1	0.9	1	0.7	0.5	0.5	0.3

STANDARD ERROR TABLE 4.5 Standard error (SE) figures for Chapter 4 Tables F.6 and F.7 (percentage of gender and racial/ethnic groups among full-time faculty in Mathematics and Statistics Departments): Fall 2000.

Tables F.6 & F.7		Percentage of full-time faculty				
		Asian	Black	Hispanic	White	Not known
Math PhD Depts	Full-time men	13	1	1	69	1
	SE	0.9	0.1	0.2	1.3	0.4
	Full-time women	1	0	0	13	0
	SE	0.2	0	0	0.9	0
Math MA Depts	Full-time men	8	1	4	58	1
	SE	1.2	0.3	2	3.4	0.4
	Full-time women	2	1	2	24	0
	SE	0.6	0.3	1.4	2.2	0
Math BA Depts	Full-time men	5	3	1	60	1
	SE	1.1	1	0.3	2.5	0.3
	Full-time women	2	0	0	27	0
	SE	0.6	0	0	1.9	0
All Math Depts	Full-time men	9	1.5	2	63	1
	SE	0.6	0.4	0.5	1.4	0.2
	Full-time women	2	0	1	21	0
	SE	0.3	0	0.4	1	0
Stat PhD Depts	Full-time men	17	0	0	63	4
	SE	1.3	0	0	1.5	1.2
	Full-time women	4	0	0	12	0
	SE	0.4	0	0	0.7	0
Stat MA Depts	Full-fime men	7	1	3	66	0
	SE	2.5	0.6	1.4	5.1	0
	Full-time women	3	0	0	20	0
	SE	0.8	0	0	2.7	0
All Stat Depts	Full-time men	15	0	1	63	3
	SE	1.1	0	0.2	1.4	1
	Full-time women	3	0	0	13	0
	SE	0.4	0	0	0.7	0.2

STANDARD ERROR TABLE 4.6 Standard error (SE) table for Chapter 4 Table F.8 (percentage of gender and racial/ethnic groups among part-time faculty in Mathematics Departments and Statistics Departments by school type): Fall 2000.

		Percentage of part-time faculty				
Table F.8		Asian	Black	Hispanic	White	Not known
Math PhD Depts	Part-time men	3	2	1	51	2
	SE	0.6	0.5	0.4	2.9	1
	Part-time women	2	1	1	37	1
	SE	0.5	0.6	0.6	3.3	0.7
Math MA Depts	Part-time men	4	2	3	52	2
	SE	1.6	0.9	1.2	2.9	0.9
	Part-time women	1	0	3	32	1
	SE	0.5	0.2	1.6	2.7	0.5
Math BA Depts	Part-time men	1	1	1	54	2
	SE	0.2	0.5	0.7	4.8	0.9
	Part-time women	1	1	0	39	0
	SE	0.7	0.8	0	4.2	0.3
All Math Depts	All part-time men	2	2	2	53	2
	SE	0.6	0.4	0.5	2.5	0.6
	All part-time women	1	1	1	36	1
	SE	0.4	0.4	0.5	2.4	0.3
Stat PhD Depts	Part-time men	18	0	0	45	0
	SE	3.1	0	0	5	0
	Part-time women	7	0	2	28	0
	SE	1.6	0	1.1	4.4	0
Stat MA Depts	Part-time men	10	0	10	60	0
	SE	4.6	0	4.6	6.2	0
	Part-time women	0	0	0	20	0
	SE	0	0	0	8.1	0
All Stat Depts	All part-time men	17	0	2	48	0
	SE	2.6	0	1	4.2	0
	All part-time women	6	0	2	27	0
	SE	1.3	0	0.9	4	0

STANDARD ERROR TABLE 6.1 Standard error (SE) figures for Chapter 6 Tables TYR.3, TYR.5, and TYR.8 in Chapter 6: Fall 2000.

Course number	Type of course	TYR.3 Enrollment (1000s)	SE	TYR.5 %	SE	TYR.8 Average section size	SE
1	Arithmetic & Basic mathematics	122	11.1	56	7.1	22.2	0.6
2	Pre-algebra	87	9.4	41	7.1	22.5	0.8
3	Elementary algebra (HS level)	292	15.9	78	6.9	24.3	0.5
4	Intermediate algebra (HS level)	255	12.7	90	2.4	26.1	0.7
5	Geometry (HS level)	7	2.4	14	2	21	0.9
6	College algebra (above Intrmed alg)	173	11.2	83	2.9	25.5	0.8
7	Trigonometry	30	2.4	66	7.1	23	1
8	College algebra & trig (combined)	16	3.4	32	6.9	26.7	1.6
9	Intro to mathematical modeling	7	3.7	12	6.6	20.2	2.2
10	Precalc/ Elem fnctns/ Analyt geom	48	4.4	65	7.1	23.5	0.9
11	Mainstream calculus I	53	3.6	94	1.2	22.5	0.8
12	Mainstream calculus II	20	1.9	88	6.6	20.4	0.7
13	Mainstream calculus III	11	0.9	67	7	15.3	0.7
14	Non-mainstream calculus I	16	1.5	40	3.3	21.6	1
15	Non-mainstream calculus II	1	0.4	6	1.7	20.3	3.8
16	Differential equations	5	1	59	7	16.1	1.2
17	Linear algebra	3	0.4	39	7	17.6	1.4
18	Discrete mathematics	3	0.7	19	2.3	20.4	1.9
19	Elem statistics (with or w/o Probability)	71	5.1	83	6.7	25.2	0.7
20	Probability (with or w/o Statistics)	3	1.1	4	1.3	22.1	0.9
21	Finite mathematics	19	2.6	32	3.3	22.8	0.9
22	Mathematics for liberal arts	43	4.3	50	3.3	24.3	0.7
23	Math for elementary school teachers	18	2.5	49	7.1	20.9	0.9
24	Business math (not transf)	8	1.3	14	2.4	19.7	1
25	Business math (transferable)	7	1.7	19	6.7	22.1	1.1
26	Technical math (non-calculus)	13	1.5	36	3.4	16.5	1
27	Technical math (calculus-based)	2	0.5	9	1.8	17.8	1.7
28	Other mathematics courses	14	2	--	--	18.8	0.9
29	Computers and society	2	1.2	--	--	20.6	0.3
30	Introduction to software packages	16	6.4	--	--	20.3	1.3
31	Issues in Computer Science	1	1	--	--	30.6	0.7
32	Computer programming I	6	1.5	--	--	20.6	0.9
33	Computer programming II	2	0.5	--	--	18.1	1.7
34	Adv programming & data structures	1	0.3	--	--	21.4	4.2
35	Database management systems	1	0.4	--	--	12.9	2.4
36	Discrete mathematics for CS	0	0	--	--	15.1	2.3
37	Other Computer Science courses	10	5.5	--	--	17.7	4.6
	Total	1386	42.2	--	--	--	--

Note: 0 in Column 1 means less than 500 enrollments.

STANDARD ERROR TABLE 6.2 Standard error (SE) figures for Chapter 6 Table TYR.9: Fall 2000.

Table TYR.9					
Course number[1]	Type of course	Number of sections	SE Number of sections	Percentage of sections taught by part-time faculty	SE % by part-time
1-5	Remedial	29,891	1,382	58	1.4
6-10	Precalculus	10,822	497	33	3.1
11-13	Mainstream calculus	3,942	248	15	1.7
14-15	Non-mainstream calculus	784	78	25	2.6
16-18	Advanced level	625	82	12	2.9
19-20	Statistics	2,937	198	34	2.7
21-25	Service courses	3,905	248	39	2.5
26-27	Technical mathematics	816	87	43	5.1
28	Other mathematics	695	--	41	--
29-37	Computer science	2,077	722	39	4.1
1-37	All courses	56,495	1,899	46	1.2

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

STANDARD ERROR TABLE 6.3 Standard errors (SE) for Chapter 6 Table TYR.10, showing percentage of sections using different instructional methods [SE figures in brackets]: Fall 2000.

Table TYR.10		Percentage of sections taught using														Number of sections	
Course number	Type of course	graphing calculator		writing component		computer assignments		group projects		weekly computer lab		standard lecture method		distance learning			
1	Arithmetic	3	[1.2]	5	[1.4]	12	[2.8]	11	[2.2]	19	[3.7]	69	[4.2]	0.7	[0.2]	5,425	[510]
2	Pre-algebra	5	[3.1]	10	[2.6]	12	[3.9]	14	[2.7]	17	[4.5]	84	[3.1]	1.5	[0.4]	3,561	[398]
3	Elementary algebra	20	[3.5]	12	[2.4]	12	[2.2]	14	[2.0]	14	[2.4]	78	[2.6]	1.3	[0.2]	111	[645]
4	Intermed algebra (HS)	31	[3.5]	13	[2.1]	8	[1.5]	16	[2.2]	8	[1.5]	79	[2.6]	1.8	[0.2]	9,378	[448]
5	Geometry (HS)	32	[19.3]	4	[2.1]	3	[1.5]	6	[2.8]	2	[1.3]	86	[4.2]	4.9	[2.1]	354	[110]
6	College algebra	74	[3.8]	21	[4.2]	11	[2.1]	16	[2.4]	5	[1.8]	83	[2.9]	6.7	[1.8]	6,619	[454]
7	Trigonometry	67	[5.7]	12	[5.2]	4	[1.6]	10	[2.1]	3	[1.6]	89	[2.5]	0.8	[0.4]	1,291	[106]
8	College algebra & trig	86	[5.3]	15	[4.4]	11	[4.1]	15	[4.4]	1	[0.7]	75	[9.7]	2.8	[1.7]	592	[106]
9	Intro math modeling	87	[7.9]	73	[17.7]	24	[18.6]	86	[10.3]	26	[17.6]	79	[18.3]	0.9	[0.8]	329	[159]
10	Precalculus[1]	83	[4.1]	22	[3.8]	16	[3.4]	20	[3.5]	8	[2.7]	86	[3.3]	1.6	[0.7]	1,991	[191]
11	Mnstrm calculus I	78	[5.6]	31	[4.5]	35	[3.5]	27	[3.3]	17	[3.3]	79	[5.6]	1.6	[0.5]	2,298	[117]
12	Mnstrm calculus II	74	[5.8]	25	[2.9]	37	[4.5]	25	[3.8]	16	[3.1]	80	[6.0]	2.4	[1.2]	957	[82]
13	Mnstrm calculus III	69	[7.4]	21	[3.8]	35	[5.2]	23	[4.0]	15	[3.8]	74	[7.8]	1.1	[0.7]	686	[77]
14	Non-mstrm calculus I	72	[3.9]	20	[4.0]	15	[4.2]	20	[3.9]	6	[2.4]	77	[4.0]	3.1	[1.6]	728	[71]
15	Non-mstrm calculus II	73	[9.8]	39	[14.5]	24	[15.4]	8	[4.7]	19	[15.6]	68	[15.3]	19.	[15.	57	[17]
16	Differential equations	52	[12.6]	14	[5.0]	26	[7.3]	17	[5.9]	11	[3.7]	65	[15.3]	1.5	[1.3]	290	[70]
17	Linear algebra	69	[6.8]	29	[6.9]	40	[6.8]	24	[6.7]	19	[6.5]	83	[4.6]	3.7	[2.3]	177	[22]
18	Discrete mathematics	47	[9.8]	40	[10.7]	23	[7.4]	30	[11.8]	8	[4.4]	53	[10.3]	0	[0]	157	[31]
19	Elementary statistics	59	[4.4]	50	[4.6]	46	[4.5]	35	[4.2]	28	[4.2]	79	[3.1]	5.8	[1.2]	279	[193]
20	Probability	56	[17]	55	[14]	59	[16]	4	[3.4]	48	[18.3]	87	[6]	2	[1.4]	144	[52]
21	Finite mathematics	61	[6.6]	17	[4.2]	8	[2.4]	18	[4.1]	3	[1.4]	79	[5.8]	0.4	[0.3]	750	[98]
22	Math for liberal arts	20	[4.1]	41	[4.9]	15	[3.6]	32	[4.5]	5	[3]	79	[4]	5.5	[1.1]	1,668	[163]
23	Math for elem tchrs	28	[5.8]	66	[7.4]	21	[5.1]	58	[7.2]	2	[1.2]	65	[7.4]	1.4	[0.9]	810	[105]
24	Business math[2]	8	[5.1]	8	[3.8]	17	[6.1]	10	[4.8]	12	[5.8]	75	[8.6]	4.9	[2.1]	379	[65]
25	Business math[3]	44	[12]	6	[3.6]	3	[1.6]	4	[2.2]	1	[0.5]	86	[4.4]	0	[0]	298	[74]
26	Tech math (non-calc)	36	[6.3]	16	[5.1]	13	[4.6]	13	[4.5]	6	[3.1]	82	[5.1]	0	[0]	717	[81]
27	Tech math (calculus)	49	[13.3]	9	[4.7]	12	[5.1]	9	[4.7]	7	[3.8]	93	[4.6]	0	[0]	100	[25]
28	Data processing	31	[6.8]	30	[7.2]	20	[4.6]	23	[6.3]	12	[4.2]	76	[6.2]	3.8	[1.9]	695	[89]
29	Computers & society	0	[0]	90	[7.3]	93	[5.4]	17	[11.1]	87	[8.6]	82	[13.2]	0	[0]	105	[57]
30	Intro to software	0	[0]	62	[17.7]	99	[5.5]	43	[22.5]	99	[6]	19	[12.5]	6.5	[4]	771	[325]
31	Issues in CS	0	[0]	6	[7.1]	100	[0]	100	[0]	100	[0]	100	[0]	0	[0]	47	[42]
32	Cmptr programming I	0	[0]	27	[9.7]	97	[2.7]	17	[8]	87	[5.1]	60	[15.1]	0	[0]	285	[74]
33	Cmptr programming II	0	[0]	43	[15.3]	86	[8.8]	12	[6.2]	57	[12]	77	[10.5]	3.3	[2.7]	87	[24]
34	Adv prgm & data str	0	[0]	47	[15.6]	100	[0]	5	[4.5]	59	[14.7]	76	[10.8]	0	[0]	52	[15]
35	Database mgmt	0	[0]	0	[0]	56	[26.1]	11	[8.5]	53	[25.8]	15	[1.2]	6.3	[3.7]	69	[35]
36	Discrete math for CS	66	[17.2]	33	[21.3]	21	[15.6]	33	[21.3]	21	[15.6]	100	[0]	0	[0]	13	[5]
37	Other CS courses	0	[0]	2	[1.5]	98	[1.9]	1	[1]	92	[7.2]	71	[4.3]	3.1	[1.1]	648	[461]
	All courses	37	[2.1]	19	[2]	18	[1.6]	18	[1.7]	15	[1.6]	78	[1.8]	2.5	[0.3]	56,495	[1899]

[1] Precalculus, Elementary functions, and Analytic geometry.
[2] Not transferable for credit toward a bachelors degree.
[3] Transferable for credit toward a bachelors degree.

STANDARD ERROR TABLE 6.4 Standard error (SE) figures for Chapter 6 Tables TRY.6, TYR.7, TYR.14, TYR.15, and TYR.16: Fall 2000.

Table TYR.6	Pct	SE
MS Calc I	94	2
Diff Eqn	59	7
Linear Alg	39	7
Discrete Math	19	2
Elem Stat	83	7
Finite Math	32	3
Lib Arts Math	50	3
Math/ Elem Sch Tchrs	49	7
Tech Math (non-Calc)	36	3
Tech Math (Calc)	9	2

TYR.14	Percent
Students	96
SE	1
FT Fac	42
SE	7
Paraprof	68
SE	7
PT Fac	48
SE	7

TYR.15	Enroll	SE
Arithmetic	43	8
HS Alg	27	7
HS Inter Alg	10	4
Coll Alg	1	1
Trig/Precalc	0	0
Calc/DE	0	0
Bus Math	18	3
Stat & Prob	7	1
Tech Math	5	1
Other	7	3
Total	118	17

TYR.7	Avg Sect	SE
Remedial	24.5	0.4
Precalc	24.8	0.6
Calculus	20.8	0.5
Statistics	25.2	0.6
CS	18.8	2
All	23.7	0.4
Remed>35	10.4	1.3
Precalc>35	13.6	2.5
Calculus>35	9	1.3
Stat>35	13.2	1.7
CS>35	4	2.6
All>35	10.3	1.2

TYR.16	Enroll	SE
Nat Sci	0	0
Occ Prog	7	2
Business	24	3
Soc Sci	1	0.2
Learning Ctr	14	5
CS	3	3
Other	67	16

STANDARD ERROR TABLE 7.1 Standard error (SE) for various TYR tables from Chapter 7 showing table entry and SE: Fall 2000.

	Full-Time Faculty	SE (FT)	Part-Time Faculty	SE(PT)
TYR.17				
Number of Faculty	6960	218	14887	601
TYR.20 & TYR.22				
Doctorate - Percentage	16	1.3	6	0.5
MA - Percentage	81	1.1	70	2.6
BA - Percentage	3	1.1	24	2.7
TYR.24 & TYR.25				
Men - Percentage	51	1.4	57	1.6
Women - Percentage	49	1.4	43	1.6
TYR.26, TYR.29, & TYR.30				
Minorities - Percentage of All Faculty	13	1.2	13	1.3
Minorities - Percentage of Faculty Age <40	20	2.3	--	--
TYR.27, TYR.28, & TYR.31				
Asian - Percentage	4	0.4	4	0.5
Black - Percentage	5	0.6	6	0.9
Amer. Indian - Percentage	1	0.6	0	0
Hispanic - Percentage	3	0.6	3	0.7
White - Percentage	85	1.4	82	2.1
Unknown - Percentage	2	0.5	5	1.3
TYR.36				
Degrees of New Hires				
Doctorate - Percentage	13	4.5	--	--
MA - Percentage	66	12.3	--	--
BA - Percentage	19	14.3	--	--
Unknown - Percentage	2		--	--
TYR.37				
Ethnicity of New Hires				
Asian - Percentage	7	3	--	--
Black - Percentage	1	0.6	--	--
Hispanic - Percentage	5	2.8	--	--
White - Percentage	86	4.5	--	--
Other - Percentage	1		--	--

STANDARD ERROR TABLE 7.2 Standard errors (SE) for various faculty age tables from Chapter 7 showing table entry and SE: Fall 2000.

	TYR.32		**TYR.38**	
	All Perm. FT Faculty %	SE	New Hires %	SE
Age <30	4	0.5	11	3.9
Age 30–34	9	0.9	21	6.4
Age 35–39	13	1.4	37	13.2
Age 40–44	11	0.8	5	2
Age 45–49	15	1.3	6	3.2
Age 50–54	20	1.3	12	4.6
Age 55–59	16	1.2	6	3.2
Age >59	11	1.3	3	2.7
TYR.33	Women %	SE	Men %	SE
Age <35	6	0.8	7	0.8
Age 35–44	12	1	12	1.4
Age 45–54	20	1.5	16	1.4
Age >54	10	0.8	17	1.4
TYR.34	Ethnic Minority %	SE		
Age <35	20	2.8	--	--
Age 35–44	31	3.9	--	--
Age 45–54	28	2.7	--	--
Age >54	21	3	--	--

STANDARD ERROR TABLE 7.3 Standard error (SE) figures for Chapter 7 Tables TYR.18, TYR.19, TYR.21, TRY.23, and TRY.35: Fall 2000.

Table TYR.18	Pct	**Table TYR.19**	Pct	**Table TYR.21**	PhD	MA	BA	**Table TYR.23**	PhD	MA	BA	**Table TYR.35**	Pct
<10 hrs	0	HS	25	Math	7	54	1	Math	2	33	10	Grad School	8
SE	0	SE	2	SE	1	2	0.5	SE	0.3	2	1	SE	2
10 to 12 hrs	12	Other Dept	7	Math Ed	5	18	1	Math Ed	1	20	5	Same TYC	34
SE	8	SE	1	SE	1	2	1	SE	0	2	1	SE	6
13 to 15 hrs	72	Other TYC	2	Stat	1	2	0	Stat	1	2	1	FYC	10
SE	9	SE	1	SE	0.2	0.3	0	SE	0.2	0.2	0.7	SE	4
16 to 18 hrs	13	FYC	2	CS	0	1	0	CS	0	1	0	Other TYC	19
SE	3	SE	0.3	SE	0	0.3	0	SE	0	0.2	0	SE	4
19 to 21 hrs	3	Industry	20	Other	2	6	0	Other	2	14	8	HS	22
SE	2	SE	1	SE	0.3	1	0	SE	0.3	2	2	SE	9
>21 hrs	0	Grad Sch	3									Nonacademic	6
SE	0	SE	0.3									SE	2
		None	41									Unemp	0
		SE	2									SE	0

STANDARD ERROR TABLE 7.4 Standard error (SE) figures for Chapter 7 Tables TYR.39, TYR.40, TYR.43, TYR.44, and TYR.48: Fall 2000.

Table TYR.39	Number
Died or Ret	163
SE	23
FYC	17
SE	10
Other TYC	43
SE	12
HS	0
SE	0
Nonacad	14
SE	5
Grad Sch	10
SE	9
Other	60
SE	18
Ukn	94
SE	67
Total	401
SE	81

Table TYR.40	Pct
Own Desk	12
SE	2
Share with 1	5
SE	1
Share with >1	51
SE	5
No Desk	31
SE	4

Table TYR.43	For FT	For PT
Other Fac	64	60
SE	4	7
Div Head	52	28
SE	7	7
Students	90	87
SE	6	7
Written	48	40
SE	7	7
Self	46	24
SE	7	7

Table TYR.48	Own Campus	Multi-campus
Math Dept	33	10
SE	3	6
Math & CS	4	0
SE	1	0
Math & Sci	34	2
SE	7	1
Other	14	1
SE	3	1

Table TYR.44	Pct
Employer	36
SE	4
Prof Org	31
SE	3
Papers	3
SE	0.5
Grad Ed	8
SE	1

STANDARD ERROR TABLE 7.5 Standard error (SE) figures for Chapter 7 Tables TYR.45 and TYR.46: Fall 2000.

Tables TYR.45 & TYR.46							
Issue	Minor or Not	Somewhat	Major	Issue	Minor or Not	Somewhat	Major
Remediation	7	30	62	Class size	65	25	10
SE	2	3	3	SE	8	7	7
Motivation	17	37	47	Fac vitality	72	18	9
SE	3	7	7	SE	8	3	7
Success rate	31	47	22	CS staffing	72	9	18
SE	7	7	3	SE	12	2	8
Salaries	27	36	36	HS coordination	72	22	6
SE	4	7	7	SE	11	7	2
Too many PT	38	23	39	Transfer rate	88	11	2
SE	9	3	7	SE	11	2	0.6
Student cmptrs	76	21	3	Curric flexibility	85	14	1
SE	8	7	1	SE	10	3	0.6
Faculty cmptrs	90	7	2	Stat staffing	81	17	2
SE	4	2	1	SE	8	7	1
Travel funds	59	26	15	Dual enrollment	77	14	8
SE	10	7	3	SE	11	7	2
Dept sppt	78	17	5	Outsourcing	98	1	1
SE	10	3	2	SE	10	0.7	0.4
Trans. courses	63	30	8	Distance Ed	82	8	10
SE	10	7	2	SE	8	2	7
Classrooms	51	32	17				
SE	8	7	3				