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1987 ANNUAL AMS-MAA SURVEY

(Second Report)

Vital Statistics in the Mathematical Sciences:
Enrollments, Faculty Size and Mobility, Majors and Graduate Students,
with an Update on Employment of New Doctorates
Fall 1987

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HIGHLIGHTS

1. *Our final (spring) count of new doctorates in the mathematical sciences shows fewer than 400 U.S. citizens among the 874 doctoral recipients in the U.S. and Canada—this is the lowest number in two decades.*
2. *Group M and B departments (departments granting a master's or bachelor's degree as the highest degree) report a larger than usual retirement/death rate; the number of doctoral faculty retiring or dying last year is estimated as twice that of the previous year.*
3. *Undergraduate enrollments in mathematics courses are down for the third consecutive year. Junior-senior mathematics totals are down more than 4%. Remedial mathematics and "pre-calculus" continue to consume a considerable chunk of collegiate mathematics education.*
4. *Women comprise 17% of the new doctorate population. Twenty percent of the women new doctorates report taking employment in the doctorate-granting institutions, but they represent only 12% of the total new doctorates hired by these institutions.*
5. *For the third straight year approximately 20% of the new doctorates report foreign academic or nonacademic employment ("foreign" excludes Canadian).*
6. *For the fifth consecutive year nearly half of the new doctorates are in applied fields and more than a fifth are in statistics.*
7. *In most U.S. doctorate-granting departments, U.S. citizens comprise more than half of the first-year and total graduate school population, but rarely more than 60%.*

I. INTRODUCTION

We report on several items of general and specific interest to the mathematical community, based on our analysis of the data compiled in the 1987 Annual AMS-MAA Survey. We begin with an update on the size and employment status of the 1986–1987 class of new doctorates, and then we direct our attention to the information provided by the departmental responses to the surveys on Faculty Mobility and Enrollments and Departmental Size. The numbers we provide on faculty size, mobility and status (Tables 2A, 2B, and 2C), course enrollments (Table 5), majors (Table 6), and graduate students (Table 7) are estimates based on extrapolation of data reported (for a detailed explanation of our extrapolation methodology see the Second Report, 1986 Survey, February 1987 *Notices*, page 255). However, the Mobility and Enrollments Surveys requested data for fall 1986 and fall 1987, so we have data for consecutive years from the same sample—this is the basis of the percentage increase/decrease calculations which, for example, we made for fall 1986 versus fall 1987 Enrollments, Majors, and Graduate Students (Tables 5, 6, and 7).

A description of the classification of departments, together with a list of institutions in Groups I and II, can be found in the Appendix of this report.

A first report of the 1987 Survey appeared in the November 1987 *Notices*, pages 1072–1101, with corrections in the January 1988 *Notices*, pages 21–23. It included a report of the survey of faculty salaries, tenure, and women, a first report of the survey of new 1986–1987 doctorates, and a list of the names and thesis titles of the 1986–1987 doctorates. This second report includes an update of the fall 1987 employment status of new doctorates, an analysis of faculty mobility, a report on fall 1987 enrollments and class sizes, and a supplementary list of 1986–1987 doctorates.

The 1987 Annual AMS-MAA Survey represents the thirty-first in an annual series begun in 1957 by the Society. The 1987 Survey, the first to be jointly sponsored by the American Mathematical Society and the Mathematical Association of America, is under the direction of the AMS-MAA Committee on Employment and Educational Policy (CEEP), whose members in 1987 were Morton Brown, Stefan A. Burr, Edward A. Connors (chair), Philip C. Curtis, Jr., David J. Lutzer, Donald C. Rung, and Audrey A. Terras. The questionnaires were devised by CEEP's Data Subcommittee whose members in 1987 were Lida K. Barrett, Edward A. Connors (chair), Lincoln K. Durst (consultant), James F. Hurley, Charlotte Lin, James W. Maxwell (ex officio), Donald E. McClure, and Donald C. Rung. Comments or suggestions regarding this Survey may be directed to the subcommittee.

II. UPDATE ON THE 1986–1987 NEW DOCTORATES

In the First Report of this Survey (November 1987 issue of *Notices*, pages 1081–1086) we reported 845 new doctorates in the mathematical sciences (779 from U.S. universities and 66 from Canadian universities) — this is the fall count. There were an additional 29 new doctorates, all from U.S. universities with a Group I, II, III, IV or Va classification. We now update tables from the First Report (New Doctorates, Fall and Spring Counts, and New Doctorates awarded by Groups I–Va, VI, see November 1987 *Notices*, page 1081) with this new information to produce the 1986–1987 spring counts (874 new doctorates, with 808 awarded by U.S. universities). We do not, however, include the 29 additional new doctorates in our updated employment matrices (Tables 1A, 1B and 1C).

Useable Responses

	Groups							
	I	II	III	IV	V	VI	M	B
Enrollments and Departmental Size*	35	38	56	41	13	13	119	370
Faculty Mobility	30	32	46	39	11	9	110	345

*There are 4 parts to the Enrollments and Departmental Size Form (Enrollments, Majors, Departmental Size, and Graduate Students). The number given is the number of returns with a useable response on the departmental size.

Useable Responses (Percentage of Surveyed Departments)

	Groups							
	I	II	III	IV	V	VI	M	B
Enrollments and Departmental Size*	90	88	71	60	42	46	45	39
Faculty Mobility	77	74	58	57	35	32	42	36

*As above.

New Doctorates Fall and Spring Counts

	1982-1983	1983-1984	1984-1985	1985-1986	1986-1987
Fall	792	789	769	801	845
Spring	840	827	807	827	874

New Doctorates U.S. Institutions, Spring Count

1982-1983	1983-1984	1984-1985	1985-1986	1986-1987
796	775	765	782	808

New Doctorates Awarded by Groups I–Va, VI, Spring Count

1982-1983	1983-1984	1984-1985	1985-1986	1986-1987
767	735	755	743	809

A significant portion of the 845 new doctorates, 17%, reported foreign academic employment (compared to 11% and 12%, respectively, in the last two years). The percentage of the new doctorates reporting foreign academic or nonacademic employment is 19% (compared to 19% and 20%, respectively, in the last two years).

Women comprise 17% of the present new doctorate population, and 20% of the 145 found employment in the doctorate-granting departments I–VI. However, women represent only 12% of the total of new doctorates hired by the research departments. In contrast, women comprise 26% of the new doctorates hired by Group M, and 19% of the new doctorates hired by Group B. Business and industry hired 104 of the new doctorates (60 males, 24 females), but none of our female respondents reports government employment.

The research fields of the new doctorates continue to have an applied flavor (see Table 1C). For the last five years half, or nearly half, of the new doctorates specialized in statistics, applied mathematics, operations research, or computer science. In fact, in each of the years in question between one-fifth and one-fourth of the degrees were in statistics.

There are a few noticeable differences from last year in the hiring of new doctorates by academic institutions: Group I hired 12% fewer, Group II hired 12% more, and Group III hired exactly the same number. In departments of statistics and biostatistics (Group IV) new doctorate hiring was down considerably (by 22%), whereas Canadian academic hiring was up considerably (by 38%). Group M departments increased their new doctorate hiring by 11% over last year's total, and Group B increased theirs by 9%. Government hiring of new doctorates was 19, down from the 17 reported last year, and the number hired by business/industry fell to 104 from 109. Not surprising is that most, but by no means all, of the new doctorates hired by government, business and industry specialized in statistics or applied mathematics.

Finally, we note that the names of the new doctorates and their thesis titles are published in the *Notices* (November 1987 issue and a supplemental list in the Appendix of this report).

Table 1A: Employment Status of 1986–1987 New Doctorates in the Mathematical Sciences

Type of Employer	PURE MATHEMATICS											
	Algebra and Number Theory	Analysis and Functional Analysis	Geometry and Topology	Logic	Probability	Statistics	Computer Science	Operations Research	Applied Mathematics	Mathematics Education	Other	Total
Group I	23	17	19	2	1	1	0	0	10	0	5	78
Group II	7	7	5	0	3	2	1	2	8	0	3	38
Group III	7	12	1	1	1	7	3	2	12	1	0	47
Group IV	0	0	0	0	3	23	0	1	0	0	1	28
Group V	0	0	0	0	0	0	0	0	9	0	2	11
Masters	13	13	12	0	3	12	1	2	11	1	1	69
Bachelors	16	12	10	0	3	11	0	3	12	2	3	72
Two-year College or High School	4	1	1	1	0	0	0	0	1	0	0	8
Other Academic Departments	2	4	0	2	1	32	5	12	7	0	12	77
Research Institutes	3	5	5	0	0	3	0	3	7	0	2	28
Government	1	0	0	0	0	7	1	1	5	0	4	19
Business and Industry	6	9	2	4	7	31	1	12	15	0	17	104
Canada, Academic	4	7	2	0	1	8	1	1	3	0	6	33
Canada, Nonacademic	0	0	0	0	0	3	0	0	1	0	0	4
Foreign, Academic	22	29	14	3	4	25	2	9	27	1	9	145
Foreign, Nonacademic	3	4	0	0	0	5	1	2	1	0	3	19
Not seeking employment	1	2	2	0	0	0	0	0	2	0	1	8
Not yet employed	2	5	1	0	0	8	0	0	5	0	1	22
Unknown	4	6	5	3	0	4	2	1	6	1	3	35
Total	118	133	79	16	27	182	18	51	142	6	73	845

Table 1B: Employment Status of 1986-1987 New Doctorates in the Mathematical Sciences Females Only

Type of Employer	PURE MATHEMATICS											
	Algebra and Number Theory	Analysis and Functional Analysis	Geometry and Topology	Logic	Probability	Statistics	Computer Science	Operations Research	Applied Mathematics	Mathematics Education	Other	Total
Group I	1	2	1	0	0	0	0	0	1	0	0	5
Group II	1	0	0	0	0	1	0	1	2	0	1	6
Group III	1	0	0	0	0	0	1	1	3	1	0	7
Group IV	0	0	0	0	2	5	0	0	0	0	0	7
Group V	0	0	0	0	0	0	0	0	0	0	0	0
Masters	3	5	1	0	0	4	0	0	4	1	0	18
Bachelors	4	2	1	0	0	2	0	0	2	1	2	14
Two-year College or High School	0	0	0	0	0	0	0	0	0	0	0	0
Other Academic Departments	0	1	0	0	0	10	1	3	0	0	4	19
Research Institutes	0	0	0	0	0	0	0	0	0	0	1	1
Government	0	0	0	0	0	0	0	0	0	0	0	0
Business and Industry	1	0	0	1	2	12	0	1	3	0	4	24
Canada, Academic	0	0	0	0	0	2	0	0	0	0	2	4
Canada, Nonacademic	0	0	0	0	0	1	0	0	0	0	0	1
Foreign, Academic	1	3	2	0	2	7	1	1	4	1	1	23
Foreign, Nonacademic	2	1	0	0	0	3	0	0	0	0	0	6
Not seeking employment	0	0	1	0	0	0	0	0	2	0	0	3
Not yet employed	0	1	0	0	0	1	0	0	1	0	0	3
Unknown	1	1	0	1	0	1	0	0	0	0	0	4
Total	15	16	6	2	6	49	3	7	22	4	15	145

Table 1C: Fields of New Doctorates

	Year Surveyed				
	1982–1983	1983–1984	1984–1985	1985–1986	1986–1987
Number (Fall Count)	792	789	769	801	845
Specialty:					
Applied Math	103 (13%)	110 (14%)	115 (15%)	149 (19%)	142 (17%)
Statistics	188 (24%)	173 (22%)	189 (25%)	171 (21%)	182 (22%)
Operations Research	63 (8%)	66 (8%)	41 (5%)	62 (8%)	51 (6%)
Computer Science	18 (2%)	20 (3%)	15 (2%)	16 (2%)	18 (2%)
Total	372 (47%)	369 (47%)	360 (47%)	398 (50%)	393 (47%)

III. FACULTY CHARACTERISTICS: SIZE, MOBILITY, AND STATUS

We present some of the vital features of our contemporary mathematical sciences faculty in Tables 2A, 2B, 2C, 4, and 10. Estimates of current size and proportions of doctoral/nondoctoral, tenured/nontenured, and full/part-time faculty are provided, although we do not publish all the information available to us—for example, in analyzing faculty flow in Groups I-III and IV (see Tables 2A and 2B), we concentrate on full-time doctoral faculty with a refinement into tenured and nontenured, whereas the analogous analysis in Groups M and B is done for full-time faculty with a breakdown into doctoral and nondoctoral faculty.

We comment on three specific features of the future of our mathematics faculty, all related to the supply and demand for mathematical scientists. As reported in the First Report of the 1987 Survey (see November 1987 issue of *Notices*), fewer than 400 U.S. citizens earned a doctorate in the mathematical sciences during 1986–1987. Current information available to us does not indicate evidence of change in this pattern of Ph.D. productivity (see for example the data on the decline in the number of mathematics majors reported in Table 6, the size of the U.S. contingent in the graduate schools as reported in Table 8, and the pessimistic predictions inherent in reference [12]). The current mathematics faculty, however, becomes more gray as evidenced by a nearly 2% retirement/death rate of Group M and B faculty. We estimate that 1.4% of the 20,000 full-time mathematical science faculty in the U.S. retired (or died) last year. Moreover, in Groups M and B we estimate that 132 doctoral faculty retired or died last year compared to 67 the year before. Among all full-time faculty, Groups M and B had 223 retirements or deaths last year, compared to 169 the year before.

Our new data indicate that 47% of the new full-time faculty positions filled by nondoctoral faculty in Groups M and B were intended for doctorate holders—this projects to 250 nondoctorate faculty holding positions for which a doctorate-holding faculty was preferred. It is becoming increasingly more likely that vacant full-time faculty positions in Groups M and B will be filled by nondoctorate faculty. It is already the case that a considerable portion of the teaching responsibilities in Groups M and B is assumed by part-time faculty (see Table 10 and reference [8]).

Table 2A: Faculty Flow
1986–1987 to 1987–1988
Full-Time Doctorate-Holding
Faculty in 155 Doctorate-Granting
Mathematics Departments in the U.S.
(Groups I, II, III)

Sources of New Faculty

From	Nontenured	Tenured
Graduate School	143	1
Faculty position in another U.S. or Canadian college or univ. dept.	121	46
Business, industry, or government in the U.S. or Canada	7	3
Outside the U.S. or Canada	32	6
Other sources (e.g., part-time in same dept.)	16	6
Total in	319	62

Faculty Leaving

	Nontenured	Tenured
To ACADEMIC employment in the U.S. or Canada in:		
Depts. granting doctorate in math. sciences	79	50
Other four-year college or university position	40	10
Two year college	--	--
Other	13	--
Total Academic	132	60

Table 2A: Faculty Leaving (continued)

	Nontenured	Tenured
To NONACADEMIC employment in the U.S. or Canada:		
In the math. sciences, in other science, or in engineering	15	10
Other	1	4
Total Nonacademic	16	14
To OTHER:		
Currently seeking professional employment	9	
Obtained a position outside the U.S. or Canada	32	4
Either retired (and do not seek employment) or have died		57
Returned to graduate or professional school	1	
Status unknown/other	15	4
Total Other	57	65
Total Out	205	139

Received doctorate and not moving	10 (tenure status unknown)
Received tenure and not moving	129
Estimated size of full-time faculty, Fall 1987 Groups I–III	
Doctorate, Tenure status unknown	10
Doctorate, Nontenured	1,395 (+114 from Fall 1986)
Doctorate, Tenured	4,294 (+52 from Fall 1986)
Total Doctorate Faculty	5,699 (+164 from Fall 1986)*
Nondoctorate Faculty	385 (-11 from Fall 1986)
Total full-time Faculty	6,084 (+153 from Fall 1986)

*There is a typographical error in last year's total (5,533 should be 5,535)

Table 2B: Faculty Flow 1986–1987 to 1987–1988

Full-Time Doctorate-Holding Faculty in Group IV

Sources of New Faculty

From	Nontenured	Tenured
Graduate School	27	
Faculty position in another U.S. or Canadian college or univ. dept.	17	4
Business, industry, or government in the U.S. or Canada	3	
Outside the U.S. or Canada	5	
Other sources (e.g., part-time in same dept.)	3	
Total in	55	4

Table 2B: Faculty Leaving

	Nontenured	Tenured
To ACADEMIC employment in the U.S. or Canada in:		
Depts. granting doctorate in math. sciences	18	3
Other four-year college or university position	8	
Two year college		
Other	1	1
Total Academic	27	4

	Nontenured	Tenured
To NONACADEMIC employment in the U.S. or Canada:		
In the math. sciences, in other science, or in engineering	3	1
Other		1
Total Nonacademic	3	2
To OTHER:		
Currently seeking professional employment		
Obtained a position outside the U.S. or Canada	8	
Either retired (and do not seek employment) or have died		8
Returned to graduate or professional school	1	
Status unknown/other	1	
Total Other	16	12
Total Out	46	18

Received doctorate and not moving	1
Received tenure and not moving	17
Estimated size of full-time faculty, Fall 1987 Group IV	
Doctorate, Tenure status unknown	1
Doctorate, Nontenured	232 (-8 from Fall 1986)
Doctorate, Tenured	531 (+3 from Fall 1986)
Total Doctorate Faculty	764
Nondoctorate Faculty	22 (+3 from Fall 1986)
Total full-time Faculty	786 (-2 from Fall 1986)

Table 2C: Faculty Flow 1986–1987 to 1987–1988
Full-Time Mathematical Sciences Faculty in Groups M and B

Sources of New Faculty

From	Doctorate	Nondoctorate
Graduate School	199	215
Faculty position in another U.S. or Canadian college or univ. dept.	395	110
Business, industry, or government in the U.S. or Canada	83	35
Outside the U.S. or Canada	30	3
Other sources (e.g., part-time in same dept.)	30	169
Total in	737	532

Faculty Leaving

	Doctorate	Nondoctorate
To ACADEMIC employment in the U.S. or Canada in:		
Depts. granting doctorate in math. sciences	40	32
Other four-year college or university position	178	89
Two year college	3	32
Other	27	5
Total Academic	148	158

	Doctorate	Nondoctorate
To NONACADEMIC employment in the U.S. or Canada:		
In the math. sciences, in other science, or in engineering	48	54
Other	19	13
Total Nonacademic	67	67
To OTHER:		
Currently seeking professional employment	19	22
Obtained a position outside the U.S. or Canada	5	
Either retired (and do not seek employment) or have died	132	91
Returned to graduate or professional school	11	75
Status unknown/other	35	35
Total Other	202	223
Total Out	417	448

Received doctorate and not moving	43
Received tenure and not moving	331
Doctorate	296
Nondoctorate	35
Estimated size of full-time faculty, Fall 1987 Groups M and B	
Doctorate-Holding	9,658 (+363 from Fall 1986)
Nondoctorate Faculty	4,070 (+41 from Fall 1986)
Total full-time Faculty	13,728 (+404 from Fall 1986)

IV. UNDERGRADUATE ENROLLMENTS, MAJORS AND CLASS SIZE

We use a different classification of undergraduate courses in this year's Survey, so we advise caution in comparisons with earlier Surveys. Again, we emphasize that our survey forms requested data for fall 1986 and fall 1987, so our calculations of percentage changes from 1986 to 1987 are based on real data from the same sample.

We again report a decrease in undergraduate enrollments, as we have for the last two enrollment surveys (Table 5). A considerable chunk of our undergraduate teaching in the mathematical sciences is concentrated in remedial and "precalculus" mathematics. We urge the reader to compare our data on this part of the Survey to that of their own institution and to report the findings and comments to us. We note the declines in first-year calculus and "other undergraduate mathematics courses (predominantly mathematics majors)" with particular concern, since these courses are the present site of many of our future mathematical scientists. Our concern in the decline in the enrollments in calculus and upper division mathematics courses is magnified by the large decline in junior-senior level mathematics majors. We note, with emphasis, the 5% decline in majors reported by the M and B departments—a large part of the aquifer of U.S. mathematics.

V. GRADUATE ENROLLMENTS AND CITIZENSHIP

Graduate student numbers, first-year and total, reflect a robust increase over last year (Table 7), and graduate enrollments do likewise (Table 5). However, the percentages of U.S. citizens among the first-year or entire graduate population barely exceed 50%. But the relative size of the U.S. citizens in the graduate population is not the most important consideration—one should ask, however, why are there not more U.S. citizens among the doctoral candidates and recipients? Where in our educational system has the pump plugged and the pipeline leaked?

Table 3: New Mathematical Sciences Doctorates Taking Nonacademic Positions in U.S.

	1979-1980	1980-1981	1981-1982	1982-1983	1983-1984	1984-1985	1985-1986	1986-1987
In govt.	37	28	22	24	23	14	27	19
In bus./industry	165	169	141	105	110	108	109	104
Total	202	197	163	129	133	122	136	123
Total new doctorates employed in U.S.	691	732	659	583	597	557	577	579
% in govt./bus./ind.	29%	27%	25%	22%	22%	22%	24%	21%

Table 4: Estimated Net Outflow of Doctorate-Holding Faculty Members to Nonacademic Employment

	1979-1980	1980-1981	1981-1982	1982-1983	1983-1984	1984-1985	1985-1986	1986-1987
Net outflow	168	116	94	46	125	22	55	23

Table 5: Total Course Enrollments for Fall 1987 (in Thousands)
(Percent increase from fall 1986 in parentheses)*

Type of Course	Groups			
	I,II,III	IV	VI	M,B
Remedial mathematics (arithmetic, high-school algebra, geometry)	68 (-2%)		2 (+5%)	210 (+2%)
Traditional pre-calculus	123 (0%)		9 (-1%)	222 (-2%)
First-year calculus courses	203 (-1%)		35 (+2%)	234 (-3%)
Undergraduate courses in statistics	20 (-2%)	47 (+3%)	16 (+16%)	118 (-1%)
Undergraduate courses in computer science	10 (-2%)		6 (-9%)	164 (-5%)
Other undergraduate math courses (predominately math majors)	68 (-6%)		24 (+17%)	128 (-6%)
Other undergraduate math courses (predominately nonmath majors)	127 (+3%)		11 (-9%)	251 (+5%)
Total Undergrad	619 (-1%)	51 (+3%)		326 (-1%)
All graduate courses	29 (+5%)	13 (+3%)	1 (+4%)	20 (+3%)
All courses	648 (-1%)	64 (+3%)	104 (+5%)	1346 (-1%)

*This percentage is obtained from the raw data as reported for the two years on this 1987 Annual Survey. It is not based on last year's estimates.

Table 6: Majors
(Percent increase over fall 1986 in parentheses)*

Fall 1987	Groups			
	I,II,III	IV	VI	M,B
Total junior-senior majors	18,690 (-4%)	1,098 (-5%)	6,507 (-2%)	58,718 (-5%)

*See footnote for Table 5.

Table 7: Graduate Students
(Percent increase over fall 1986 in parentheses)

Fall 1987	Groups			
	I,II,III	IV	VI	M,B
First Year	2,879 (+4%)	676 (+9%)	245 (+12%)	1,456 (+18%)
All	9,177 (+5%)	2,039 (+3%)	914 (+13%)	3,420 (+9%)

Table 8: Citizenship of Graduate Students
(Percentage of U.S. citizens of graduate students whose citizenship is reported as known)

	Fall 1986		Fall 1987	
Group	First Year	All Years	First Year	All Years
I	53	53	54	52
II	55	54	58	53
III	59	58	59	58
I,II,III	55	55	57	54
IV	57	52	45	51
M	68	70	70	71

Table 9: Average Class Size Fall 1987*

Type of Course	Groups						
	I	II	III	IV	VI	M	B
Remedial mathematics (arithmetic, high-school algebra, geometry)	34	36	41		70	41	28
Traditional pre-calculus	36	38	41		69	38	30
First-year calculus courses	38	44	40		89	33	25
Undergraduate courses in statistics	31	43	71**	40	51	33	27
Undergraduate courses in computer science	42	29	24		50	22	19
Other undergraduate math courses (predominately math majors)	27	25	25		49	21	15
Other undergraduate math courses (predominately nonmath majors)	40	36	40		46	34	28
All graduate courses	11	11	10	16	5	9	15
All courses	31	34	35	30	51	30	24

*We do not provide the previous year's average as also reported in this year's survey, because there are no significant differences.

**We attribute this increase over last year's reported average of 37 to our different course groupings. The average for Fall 1986 using this same classification of courses is 64. Apparently some statistics courses were reported in the below calculus classification no longer used.

Table 10: Ratio of Full-time to Part-time Faculty (Excluding T.A.'s)* Fall 1987

	Groups							
	I	II	III	IV	V	VI	M	B
All	13:1	6:1	4:1	5:1	11:1	9:1	3:1	2:1
Doctoral	30:1	23:1	15:1	6:1	13:1	15:1	12:1	9:1

*Based on raw data from the departmental size part of the Enrollments and Departmental Size Survey (see the useable response tables listed earlier).

Appendix

ACKNOWLEDGEMENT

The Annual AMS-MAA Survey attempts to provide an accurate appraisal and analysis of various aspects of the mathematical scene vital to the entire mathematical community. Yearly, collegiate departments in the United States, and the doctoral-granting departments in Canada, are provided the opportunity to respond to this survey (Survey of New Doctorates for departments with a doctoral program in the mathematical sciences, Enrollments and Departmental Size, and Faculty Mobility for all departments). The quantity and quality of the responses directly determine the quality of the information in these reports. Without the dedicated cooperation of the secretarial and administrative support staff in the mathematical science departments we would not be able to conduct a survey, nor be confident in our analysis of its results. We are, unfortunately, unable to thank all the departmental assistants for their cooperation, but it is nonetheless appreciated. However, we are able to thank the administrative support staff of the AMS, especially Marcia Almeida, Monica Foulkes, James W. Maxwell, and James A. Voytuk. Their efforts are acknowledged and appreciated.

Groups I and **II** include the leading departments of mathematics in the U.S. according to the 1982 assessment of Research-Doctorate Programs conducted by the Conference Board of Associated Research Councils in which departments were rated according to the quality of their graduate faculty.[1]

Group I is composed of 39 departments with scores in the 3.0–5.0 range.

Group II is composed of 43 departments with scores in the 2.0–2.9 range.

Group III contains the remaining U.S. departments reporting a doctoral program.

Group IV contains U.S. departments (or programs) of statistics, biostatistics and biometrics reporting a doctoral program.

Group V contains U.S. departments (or programs) in applied mathematics/applied science, operations research and management science which report a doctoral program.

Group Va is applied mathematics/applied science; **Group Vb** is operations research and management science.

Group VI contains doctorate-granting departments (or programs) in the mathematical sciences in Canadian universities.

Group M contains U.S. departments granting a master's degree as the highest graduate degree.

Group B contains U.S. departments granting a baccalaureate degree only.

[1] These findings were published in *An Assessment of Research-Doctorate Programs in the United States: Mathematical and Physical Sciences*, edited by Lyle V. Jones, Gardner Lindzey, and Porter E. Coggeshall, National Academy Press, Washington, D.C., 1982. The information on mathematics, statistics and computer science was presented in digest form in the April 1983 issue of *Notices*, pages 257–267, and an analysis of the above classifications was given in the June 1983 *Notices*, pages 392–393.

CLASSIFICATION OF DEPARTMENTS

Group I

Brandeis University
Brown University
California Institute of Technology
California, University of (Berkeley)
California, University of (Los Angeles)
California, University of (San Diego)
Carnegie-Mellon University
Chicago, University of
Columbia University
Cornell University
CUNY Graduate School
Harvard University
Illinois, University of
Illinois, University of (Chicago)
Indiana University
Johns Hopkins University
Maryland, University of
Massachusetts Institute of Technology
Michigan, University of
Minnesota, University of
New York University
North Carolina, University of
Northwestern University
Ohio State University
Pennsylvania State University
Pennsylvania, University of
Princeton University
Purdue University
Rice University
Rutgers University
Stanford University
SUNY at Stony Brook
Texas, University of (Austin)
Utah, University of
Virginia, University of
Washington University
Washington, University of
Wisconsin, University of
Yale University

Group II

Arizona, University of
California, University of (Davis)
California, University of (Riverside)
California, University of (Santa Barbara)
Case Western Reserve University
Claremont Graduate School
Colorado, University of
Connecticut, University of
Dartmouth College

Group II (continued)

Delaware, University of
Duke University
Florida State University
Florida, University of
Georgia Institute of Technology
Georgia, University of
Iowa State University
Iowa, University of
Kansas, University of
Kentucky, University of
Louisiana State University
Massachusetts, University of (Amherst)
Michigan State University
New Mexico, University of
North Carolina State University
Northeastern University
Notre Dame, University of
Oklahoma, University of
Oregon State University
Oregon, University of
Pittsburgh, University of
Polytechnic Institute of New York
Rensselaer Polytechnic Institute
Rochester, University of
Southern California, University of
SUNY at Albany
SUNY at Buffalo
Syracuse University
Temple University
Tennessee, University of
Tulane University
Vanderbilt University
Virginia Polytechnic Institute & State University
Wayne State University

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