

CAREERS FOR WOMEN WITH DEGREES IN MATHEMATICS

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Over the past few years, much support has been given to increasing the role of women in mathematics and mathematics-related careers. Through its "Equity in Mathematics" Conferences, NCTM has provided mathematics educators a variety of strategies and materials for improving the current situation of low female enrollment in higher level high school mathematics courses. Additionally, the excellent NCTM videotapes and intervention program, "Multiplying Options and Subtracting Bias," developed under the direction of Elizabeth Fennema and narrated by Marlo Thomas, suggest to students many careers that are open to them, all requiring training in mathematics.

Having taught undergraduate mathematics to women at Saint Mary's College, a Catholic liberal arts women's college, the authors conducted a survey of their women mathematics graduates (B.A. or B.S.) over the last fifteen years to determine current employers, positions, and salaries. Results of the survey are reported in this article and are of interest to secondary mathematics teachers attempting to increase female involvement in mathematics. Surveys were sent in the spring of 1985 to all 138 mathematics graduates from 1969 through 1984. Responses were received from 97, a 72% return.

As might be expected in our technological society, more graduates were employed by computer firms than by any other type of employer, even though the college offers only a minor in computer science. Employment in business and industrial firms ranked second. In a side note, the common statement of various recruiters in recent years is of importance, especially in light of the mathematics education community's concern for problem solving. Although firms might be looking for students with degrees in business, they are very willing, often excited, to hire a student with a degree in mathematics. Why? Their comment:

After solving mathematics problems for four years, we know they can adapt to solving our problems.

Table 1 presents a listing of employers by categories. Computer firms range from IBM, Hewlett-Packard, and Electronic Data Systems to Systems House and Thorn EMI Computer Software. Business and industrial firms include Dun & Bradstreet, TRW, Bethlehem Steel, Kraft, Rusty Jones, International Harvester, McDonnell Douglas, Chicago Tribune, A.C. Nielsen, Marathon Oil, and the O'Brien Corporation. Also, due to their ability to provide complete packages of health care services in a period of increasing cost consciousness, health maintenance organizations and related medical firms are growing, employing mathematics majors to study delivery system quality.

Table 1

Employers of Women Mathematics Majors

Employer	Number	%
Computer firms	27	27.8
Business and industry	23	23.7
Health maintenance and related medical firms	10	10.3
Schools, colleges, and universities	10	10.3
Telephone companies	6	6.2
Banks	5	5.2
Insurance companies	5	5.2
NASA	1	1.0
Others	6	6.2
At home and not employed	4	4.1

The job titles or positions of the women are varied (see Table 2), with the computer field supplying the greatest number of positions: Systems analyst, systems engineer, computer services manager, engineering change analyst, business programmer/analyst, operations research analyst, information center support supervisor, computer analyst, applications consultant, and decisions support manager. Of the graduates employed, 42 (43.3%) were in computer or computer-related positions.

Business, industry, insurance, bank, and health positions include pension marketing director, general finance manager, planning control manager, credit reporter, planning development manager, network administration manager, account manager, controller, client services representative, financial consultant, export credit analyst, product manager, pension analyst, and personal finance management vice-president.

The survey information received on salaries was difficult to compile since some respondents gave salary ranges and many did not list their salaries, thus Table 2 presents only salary ranges for the job categories. Of the 42 respondents with positions in computer or computer-related fields, 13 had salaries between \$24,000 and \$35,000, while 5 had salaries greater than \$40,000. Over half of the businesswomen who responded had salaries between \$30,000 and \$60,000, with the upper extreme salary of \$120,000 for a finance manager at a major telephone company.

Table 2

Number and Salary Ranges for Women Mathematics Majors
in Job Categories

Position	Number	Salary Range
Computer or computer-related	42	\$13,000-50,000
Business	19	\$18,000-120,000
Teaching	10	\$16,000-26,000
Actuary	2	\$25,100-25,600
Statistician	1	\$20,000-25,000
Laboratory Technician	1	\$20,000-28,000
Other	8	\$11,000-16,000

Figures support the recently released 15th Annual Recruiting Trends Survey (November 1985), showing highest demands and starting salaries for workers in technical fields, with salaries for business-related workers following. The study indicated an increased demand for graduates in education, especially in mathematics. This was the first time in a decade that education had been listed among the top ten fields showing highest percentages of increase in demand. Additionally, the job market demand

remains high for women. It should be noted that most graduates responding to the Saint Mary's survey have received only an undergraduate degree in mathematics, although some are currently working on advanced degrees.

For junior high and high school mathematics teachers (and counselors), the survey results and comments by employers provide points to stress in discussing careers for women in mathematics:

- 1) Women with degrees in mathematics are employable in a wide variety of positions;
- 2) Employers are looking for problem solvers, especially for business and industry;
- 3) With over 55% of adult females working, women in mathematics can compete with men for excellent entry positions and later top level management positions;
- 4) A degree in business is not a necessary prerequisite for employment in business; and
- 5) A degree in computer science is not a necessary prerequisite for employment in the computer industry;
- 6) There is an increasing demand for teachers of mathematics at all levels.

With many young girls viewing mathematics as less valuable than boys do, it is important that mathematics teachers stress the usefulness of mathematics in career choices. The results show that a degree in mathematics presents the prospect for an exciting and rewarding career.

REFERENCES

- Fennema, E. Multiplying options and subtracting bias. Reston: NCTM, 1981.
- Scheetz, L.P. and Shingleton, J. 15th annual recruiting trends survey. East Lansing: Michigan State University, November 1985.