

## Career Options

- Accountant
- Actuarial Analyst
- Atmospheric Scientist
- Benefits Specialist
- Biomathematician
- Broker
- Chemist
- Chief Financial Officer
- Chief Information Officer
- Cryptologist
- Data Analyst
- Demographer
- Financial Consultant
- Financial Planner
- Financial Services Manager
- Grant Administrator
- Health Consultant
- Investment Banker
- Lawyer
- Management Consultant
- Mathematician
- Medical Researcher
- Meteorologist
- Operations Manager
- Operations Researcher
- Pension Fund Administrator
- Physician
- Physicist
- Professor
- Programmer
- Public Policy Analyst
- Research Associate
- Research Scientist
- Simulation Modeler
- Social Security Administrator
- Software Engineer
- State Budget Director
- Systems Analyst
- Teacher

## What is Mathematics?

Mathematics majors develop the ability to explore, conjecture, and reason logically, as well as use mathematical methods to solve problems. Mathematics is both a discipline and a tool used extensively in the sciences, medicine, engineering, and industry. Mathematicians have a romance with numbers. They deal with the hard realities of statistics and the fragile beauty of complex theorems. Mathematics majors study exactly what you would expect: lots and lots of math. Some programs offer opportunities to combine a degree in mathematics with one in business, economics, physics, or computer science.

## Occupational Opportunities

There is a steady, strong demand for math majors. Many employers (as well as graduate schools in professions such as law and medicine) will give preferential treatment to graduates with a degree in math. The study of mathematics is excellent preparation for a host of employment opportunities in business, finance, insurance, communications, electronics, scientific research of any type, and any field that has challenging problems to solve. With graduate degrees, one can have a career in actuarial science, medicine, law, college teaching, or mathematics research.

## Skills & Abilities

The study of mathematics develops the ability to solve problems through careful logical analysis and the application of a succession of complex techniques. The mathematics student develops the skills to discover the essence of problems, synthesize general theories to address specific problems, and apply theories across a variety of situations. These skills characterize the mathematics graduate as a problem-solver, whether simulating telecommunications networks, planning a marketing strategy, or projecting outcomes of public policy choices. Although these examples represent different professions, in each case the same abilities would be used. Mathematicians value working with their minds, researching, reasoning, using numbers and being creative. A representative selection of skills developed through the study of mathematics follows:

### Problem Solving

- Defines and clarifies problems
- Tests hypotheses
- Perceives patterns and structures
- Determines relevant or extraneous information
- Identifies relationships between problems/solutions

### Communication

- Communicates abstract concepts
- Translates between written text and computations
- Describes processes in non-technical terms
- Explains theories/ideas
- Summarizes findings

### Technical/Computational

- Computer modeling
- Numerical simulation
- Analyzes statistics
- Program design
- Visualizes abstract shapes/patterns
- Applies quantitative analysis

### Analysis

- Models complex systems
- Develops theories
- Projects and forecasts results
- Assesses risks
- Analyzes results
- Compares information/data
- Evaluates ideas/analytical methods



## Career Snapshot: Operations Research Analyst

Opportunities for operations research analysts exist in almost every industry because of the diversity of applications for their work. The duties of the operations research analyst vary according to the structure and management philosophy of the employer or client. Some firms centralize operations research in one department; others use operations research in one department; others use operations research in each division.

In general, analysts begin by looking at a general problem that is presented by management. They break the problem into components and decide upon the most relevant analytic technique to use to solve the problem. Analysts can use any of several techniques, including simulation, linear and nonlinear programming, dynamic programming, queuing and stochastic-process models, etc. Nearly all of these techniques, however, involve the construction of a mathematical model that attempts to describe the system being studied.

Operations research analysts generally work regular hours in an office environment. Because they work on projects that are of immediate interest to top management, operations research analysts are often under pressure to meet deadlines and work more than a 40-hour week.

## Additional Resources

U.S. Government's Occupational Outlook Handbook  
<http://bls.gov/oco>

The Mathematical Association of America (MAA)  
[www.maa.org](http://www.maa.org)

National Council of Teachers of Mathematics  
[www.nctm.org](http://www.nctm.org)

Society for Industrial and Applied Mathematics  
[www.siam.org](http://www.siam.org)

Make the Difference  
[www.makingthedifference.org/federalcareers](http://www.makingthedifference.org/federalcareers)

American Mathematical Society  
[www.ams.org](http://www.ams.org)

American Statistical Association  
[www.amstat.org](http://www.amstat.org)

Society of Actuaries  
[www.soa.org](http://www.soa.org)

IEEE Computer Society  
[www.computer.org](http://www.computer.org)

Math for America  
[www.mathforamerica.org](http://www.mathforamerica.org)