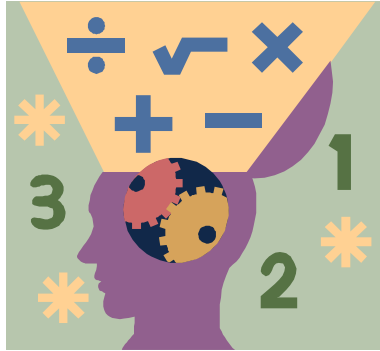


“What Can I do With a Major in...Mathematics?”



Facts about a Mathematics Degree

- The study of mathematics has both theoretical and applied aspects, which can be used to formulate and solve practical problems in business, government, engineering, and the sciences.
- Mathematics is often done in conjunction with another field, such as, biology, physics, and economics.
- Because the mathematics major covers such a broad spectrum of human activities, you will find mathematics majors employed in every sector of the economy.
- Job titles in this field rarely contain the specific words mathematician, statistician, or operations research analyst; instead, titles like technician, consultant, associate, designer, etc. are often used.

Skills Possessed by Mathematics Majors

- Ability to read and write articulately and analytically
- Ability to make sound judgments and solve quantitative problems
- Proficient in writing, speaking, and clearly explaining scientific research
- Ability to recognize, analyze and interpret data
- Ability to think logically

From the University of Manitoba's Student Counseling and Career Center website.

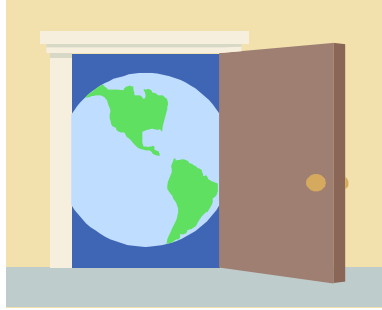
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Possible Job Titles for Mathematics Majors



Actuary

Through their knowledge of statistics, finance, and business, actuaries assess the risk of events occurring and help create policies that minimize risk and its financial impact on companies and clients. One of the main functions of actuaries is to help businesses assess the risk of certain events occurring and formulate policies that minimize the cost of that risk. For this reason, actuaries are essential to the insurance industry.

Mathematician

The work of mathematicians' falls into two broad classes—theoretical (pure) mathematics and applied mathematics. These classes, however, are not sharply defined and often overlap.

Theoretical mathematicians advance mathematical knowledge by developing new principles and recognizing previously unknown relationships between existing principles of mathematics. Although these workers seek to increase basic knowledge without necessarily considering its practical use, such pure and abstract knowledge has been instrumental in producing or furthering many scientific and engineering achievements. Many theoretical mathematicians are employed as university faculty, dividing their time between teaching and conducting research.

Applied mathematicians, on the other hand, use theories and techniques, such as mathematical modeling and computational methods, to formulate and solve practical problems in business, government, engineering, and the physical, life, and social sciences. For example, they may analyze the most efficient way to schedule airline routes between cities, the effects and safety of new drugs, the aerodynamic characteristics of an experimental automobile, or the cost-effectiveness of alternative manufacturing processes.

Statistician

Statistics is the scientific application of mathematical principles to the collection, analysis, and presentation of numerical data. Statisticians apply their mathematical and statistical knowledge to the design of surveys and experiments; the collection, processing, and analysis of data; and the interpretation of the experiment and survey results. Opinion polls, statements of accuracy on scales and other measuring devices, and information about average earnings in an occupation are all usually the work of statisticians.

Operations Research Analyst

“Operations research” and “management science” are terms that are used interchangeably to describe the discipline of using advanced analytical techniques to make better decisions and to solve problems. The procedures of operations research were first formalized by the military. They have been used in wartime to effectively deploy radar, search for enemy submarines, and get supplies to where they are most needed. In peacetime and in private enterprises, operations research is used in planning business ventures and analyzing options by using statistical analysis, data and computer modeling, linear programming, and other mathematical techniques.

Operations research analysts are often involved in top-level strategizing, planning, and forecasting. They help to allocate resources, measure performance, schedule, design production facilities and systems, manage the supply chain, set prices, coordinate transportation and distribution, or analyze large databases.

Purchasing Managers, Buyers, and Purchasing Agents

Purchasing managers, buyers, and purchasing agents shop for a living. They buy the goods and services the company or institution needs to either resell to customers or for the establishment’s own use. *Wholesale and retail buyers* purchase goods, such as clothing or electronics, for resale. *Purchasing agents* buy goods and services for use by their own company or organization; they might buy raw materials for manufacturing or office supplies, for example. *Purchasing agents and buyers of farm products* purchase goods such as grain, Christmas trees, and tobacco for further processing or resale.

Purchasing professionals consider price, quality, availability, reliability, and technical support when choosing suppliers and merchandise. They try to get the best deal for their company, meaning the highest quality goods and services at the lowest possible cost to their companies.

Budget Analysts

Efficiently distributing limited financial resources is an important challenge in all organizations. In most large and complex organizations, this task would be nearly impossible without budget analysts. These workers develop, analyze, and execute budgets, which are used to allocate current resources and estimate future financial needs.

Budget analysts work in private industry, nonprofit organizations, and the public sector. In private sector firms, a budget analyst’s main responsibility is to examine the budget and seek new ways to improve efficiency and increase profits. In nonprofit and governmental organizations, which usually are not concerned with profits, analysts try to find the most efficient way to distribute funds and other resources among various departments and programs.

Financial Managers

The duties of financial managers vary with their specific titles, which include controller, treasurer or finance officer, credit manager, cash manager, risk and insurance manager, and manager of international banking. *Controllers* direct the preparation of financial reports, such as income statements, balance sheets, and analyses of future earnings or expenses, that summarize and forecast the organization’s financial position. Controllers also are in charge of preparing special reports required by regulatory authorities. Often, controllers oversee the accounting, audit, and budget departments. *Treasurers* and *finance officers* direct the organization’s budgets to meet its financial goals. They oversee the investment of funds, manage associated risks, supervise cash management activities, execute capital-raising strategies to support a firm’s expansion, and deal with mergers and acquisitions. *Credit managers* oversee the firm’s issuance of credit,

establishing credit-rating criteria, determining credit ceilings, and monitoring the collections of past-due accounts.

Market and Financial Analysts

Your work will involve evaluating the marketplace as a whole. You'll study information on shifts in the gross national production, the cost of living, personal income growth, rates of employment, construction starts, fiscal plans of the federal government, growth and inflation rates, balance of payments, market trends, and even indexes of common stocks.

Research Analysts and Associates

Generally, you will be doing library research, collecting data in organized forms, and conducting some data manipulations. Research associates and research analysts assist in helping to put together proposals, case studies, or analyses designed to help the consultant's clients solve problems, determine future strategies, or implement programs. As you gain expertise, some responsibilities will be added, in most cases having to do with additional or more sophisticated research capabilities, quantitative manipulation of data using computer software, and the presentation of findings to your work team.

Management Analysts

As business becomes more complex, firms are continually faced with new challenges. They increasingly rely on management analysts to help them remain competitive amidst these changes. Management analysts, often referred to as *management consultants* in private industry, analyze and propose ways to improve an organization's structure, efficiency, or profits.

Management analysts might be single practitioners or part of large international organizations employing thousands of other consultants. Some analysts and consultants specialize in a specific industry, such as health care or telecommunications, while others specialize by type of business function, such as human resources, marketing, logistics, or information systems. In government, management analysts tend to specialize by type of agency. The work of management analysts and consultants varies with each client or employer, and from project to project. Some projects require a team of consultants, each specializing in one area. In other projects, consultants work independently with the organization's managers. In all cases, analysts and consultants collect, review, and analyze information in order to make recommendations to managers.

Cryptography

A cryptographer is someone who is active in the field of cryptography: someone who engages in research, writes papers, breaks algorithms and protocols, and sometimes writes his own algorithms and protocols. A cryptographer can find work as a university professor, but some large companies -- AT&T, IBM -- employ full-time cryptographers, and there are some cryptographers that work as consultants to companies that don't have full-time cryptographers on their staffs. And, of course, the NSA will snatch pretty much anyone who shows the ability to be trained as a cryptographer. The work is the same regardless: designing systems, breaking systems, doing research, publishing papers. Cryptography is a research field and it shows.

Teaching with Bachelor's, Master and PhD

If teaching at the middle or high school level is of interest to you, you'll need to major in math education so that, in addition to your math courses, you acquire the necessary education

courses to meet state certification competencies. Following graduation certified teachers apply for advertised positions in public middle and high schools that often look remarkably similar.

A master's degree in math may be helpful in securing a private school teaching position at the high school level, especially if the master's work in math corresponds to the school's needs, i.e., trigonometry, algebra, geometry, etc. Advanced degree work in a master's degree program frequently offers the opportunity to assist a faculty member in teaching an undergraduate class and may include experience designing exams and grading tests as well as staffing math help clinics.

The doctoral degree in math opens up the world of college teaching to the prospective educator.

Biostatistician

(Actual job description)

Would you like to be part of the design and analysis phases of research studies in the Department of Surgery? We are looking for an experienced statistician to assist in the planning and execution of statistical analyses for various biomedical and clinical research projects. Responsibilities include, assisting researchers with experimental design and implementation; maintaining and verifying data from research projects; implementing statistical data and computational techniques; providing statistical input and review for grant requests, presentations, reports, and publications; and preparing and presenting lectures to educate faculty, staff, residents, and students on pertinent statistical topics. Qualified candidates will have a Masters Degree in Statistics, Biostatistics, or related field and a minimum of 1 year as a consulting statistician in a biological/medical research setting. At least 1 year experience and knowledge of statistical software (SAS or comparable package) is required.

Computational Biology and Genomics

By now, we've all heard of terms like "genetic sequencing" and "human genome". The mapping of the human genome depended on the use of sophisticated mathematical and computational tools. Now that sequencing is complete, the next challenge is to understand how genes interact, how they are switched on or off, and how they differ from individual to individual. The need for newer and better mathematical and computational tools will create new career opportunities in technology, medicine, and drug development and design.

Data Mining

If you're looking for a broad mathematical area with lots of applications, look no further—data mining is the answer. Data mining involves the discovery of patterns and previously unknown information in large data sets. Emerging career opportunities will be found in applications of data mining in, for example, security, forensics, e-commerce, and sciences, such as genomics, astrophysics, and chemical engineering.

Neuroscience

As described by organizers at the Mathematical Biosciences Institute (MBI), beginning with "the discovery of the fundamental Hodgkin-Huxley equations, which model electrical impulses and oscillations in neurons, mathematicians have been involved in developing models and computational schemes for systems of neurons." This mathematical and computational research provides tools for the study of the brain, the progression of neurological diseases, and the emerging treatments for such diseases.

Materials Science

Materials science is the study of the properties, processing and production of a broad range of existing and new materials, including metallic alloys, composites, liquid crystals, biological materials, and thin films. The rational design and analysis of materials depends on mathematical models and computational tools. Career opportunities abound in science, manufacturing, and materials design for applications in fields such as aerospace, engineering, electronics and biology.

Computer Animation and Digital Imaging

To get an idea of what this field entails, consider the following description from the Fields Institute in Toronto. "Computer Animation is an eclectic science that uniquely combines mathematics, computer science, fine art, classical animation, physics, biomechanics, and anatomy, to name but a few fields. Algorithms for computer animation rely heavily on techniques from scientific computation, statistics, signal processing, linear algebra, control theory, and computational geometry." With a diverse and exciting set of applications to such areas as entertainment (movies, video games), medical diagnostics, and fine arts (dancing, sculpture, painting), there are many avenues to explore.

*The content was adopted from the following websites: <http://www.bls.gov>, and <http://www.siam.org/>. *

Career Resources for Mathematics Majors



Specific Resources

American Mathematical Society: <http://www.ams.org>

Association for Women in Mathematics, AWM: <http://www.awm-math.org/>

Mathematical Association of America: <http://maa.org>

Careers in Mathematics: <http://www.coolmath.com/careers.htm>

Math Jobs: <http://www.mathjobs.org>

Society for Industrial and Applied Mathematics, SIAM: <http://www.siam.org/>

Worldwide Job Market for Mathematicians: <http://www.math-jobs.com/>

General Resources

*CareerSearch: <http://www.careersearch.net/Hofstra>
(username-hofstra, password-career)

Occupational Outlook Handbook: <http://www.bls.gov/oco>

Riley Guide: <http://www.rileyguide.com>

*Spotlight On Careers: <http://www.spotlightoncareers.org>
(username-lacn, password-holland)

*Vault: http://www.vault.com/cb/careerlib/careerlib_main.jsp?parrefer=6123
(You will be prompted for your Novell username and password)

*These websites require you sign in using a username and password.

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Famous Math Majors/Mathematicians

Michael Jordan - Basketball player

"My mother said to go into math because that's where the money was." – Michael Jordan

Virginia Wade - Tennis player

Davey Johnson - Manager of the 1986 Mets

Teri Hatcher – Actress

Art Garfunkel – Musician

Harry Blackmun - Retired Supreme Court Justice

William J. Perry - Former Secretary of Defense

Corazon Aquino - Ex-President of the Philippines

Ralph Abernathy - Civil Rights Leader

David Dinkins - Former Mayor of New York City

Alberto Fujimori - Former President of Peru

Florence Nightingale - Applied statistics to public health, and
inventor of the pie chart

Lewis Carroll - Author of *Alice in Wonderland*

Bram Stoker - Author of *Dracula*

J.P. Morgan - Banking, steel, and railroad tycoon

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