3 What Do Mathematics Graduates Do?

Many of our graduates become teachers, but there are many other options. The possibilities are limitless for those with a creative, imaginative mind and the ability to think critically and solve real and theoretical problems. New opportunities are emerging currently due to the nature of the technology and data driven society we live in. The computer chip industry as well as Wall Street has been taking advantage of mathematicians’ expertise for decades. Now other businesses are also finding mathematicians essential for their success. Finding these opportunities can be a challenge, but the flexibility in the types of work you can do is also an asset.

According to the Bureau of Labor Statistics, the median pay for the general title “Mathematician” was $105,810 for 2016. Some positions are available to those with a bachelor's degree, while other positions require a master’s degree or PhD. In addition to the high median wage is the fact that the job outlook is great! The employment of mathematicians is expected to grow over the next 10 years much faster than the average for other occupations (21% growth). See http://www.bls.gov/ for more information on pay, education required, job outlook, and related occupations. In addition to looking at “Mathematician,” you may want to check out these careers: Actuary, Financial Analyst, Market Research Analyst, Operations Research Analyst, High School Teacher, Post-Secondary Teacher, and Statistician.

Below are several brief descriptions of potential careers and a list of websites that may help you decide which degree option is best for you. Each degree option is discussed in detail Section 5.

**Actuaries** assess the risk of certain events and study ways to minimize the impact of such a risk. Thus, actuaries play a significant role in the insurance industry. Actuaries analyze data to estimate the chance and the resulting cost of events such a death, disability, or loss of property. They also address financial questions regarding, for example, the determination of pension contributions in order to produce a certain income upon retirement or business investments to maximize returns in light of potential risks. Actuaries must pass a series of professional exams to earn designations such as Associate or Fellow in professional Actuary societies.

An **applied mathematician** attempts to use mathematical models or methods for solving real world problems. Job titles include: Contracts Specialist, Director of Information Technology, Quality Engineer, Program Manager, Project Analyst, Relations Manager, and Software Engineer or Programmer.

A **research statistician** may be hired by a particular company or industry, or work for an independent research center to do contract work for a variety of companies. For example, a research statistician may collect and analyze data for a medical study, employment patterns for a particular industry or the government, research population trends, or educational improvements.

**Statisticians** may also work as analysts. Some of this work might overlap areas that a research statistician would work on. A statistical analyst could also be a financial analyst, program analyst, or a risk management analyst.
An **operations researcher** applies mathematical concepts to help a business generate a number of ways to solve a problem and then analyze the most efficient approach. A classic example is scheduling for an airport. The landing and take-off of all planes must be scheduled precisely to avoid collisions. The handling of baggage, food and beverages must all be coordinated with flight schedules. Then it is also necessary to route passengers in a way to avoid bottlenecks in the terminal concourses, food vendors, etc. Job titles might include: Business Analyst, Director of Management Science, Economics Analyst, Quality and Customer Satisfaction Consultant, Manager in Risk Management, System Analyst, or Senior Financial Analyst.

A **theoretical mathematician** tries to further the world’s understanding of mathematics. Job titles include: Accounting Analyst, Marketing Associate, Operations Research Analyst, Product Quality Engineer, Research Associate, or System Level Designer.

**Mathematics teachers** may teach at any level. For K-5 teaching, a BA in elementary education is the norm. Some states now require middle school mathematics teachers to have a much more extensive background in mathematics. Currently in Washington State there are two ways to certify: K-8 or 5-12. An endorsement in middle school mathematics is recommended for those interested in teaching grades 6-9. If you want to teach at a community college, you will need an MS in mathematics with some math education background. For teaching at a four year institution, instructors need a minimum of an MS, and tenure-track faculty need a PhD.

Some Professional Organizations for Mathematicians and Statisticians:
- Mathematical Association of America - [http://www.maa.org](http://www.maa.org)
- Institute of Mathematical Statistics - [http://www.imstat.org](http://www.imstat.org)
- International Association for Mathematical Geosciences - [http://www.iamg.org](http://www.iamg.org)
- Society for Industrial and Applied Mathematics - [http://www.siam.org](http://www.siam.org)
- Canadian Mathematical Society - [https://cms.math.ca/](https://cms.math.ca/)
- Association for Women in Mathematics - [http://www.awm-math.org](http://www.awm-math.org)
- American Academy of Actuaries - [http://www.actuary.org](http://www.actuary.org)
- American Society of Pension Professionals & Actuaries - [http://www.asppa.org](http://www.asppa.org)
- Society of Actuaries - [http://www.soa.org](http://www.soa.org)
- Casualty Actuarial Society - [http://www.casact.org](http://www.casact.org)
- Conference of Consulting Actuaries - [http://www.ccactuaries.com](http://www.ccactuaries.com)
- American Statistical Association - [http://www.amstat.org](http://www.amstat.org)
- Insurance Accounting and Systems Association - [http://www.iasa.org](http://www.iasa.org)
- Institute for Operations Research and the Management Sciences - [http://www.informs.org](http://www.informs.org)
- National Council of Teachers of Mathematics - [http://www.nctm.org](http://www.nctm.org)
- Rethinking Schools - [http://www.rethinkingschools.org](http://www.rethinkingschools.org)
- American Mathematical Association of Two-Year Colleges - [http://www.amatyc.org](http://www.amatyc.org)
- An Internet Service for Mathematics Students and Teachers - [http://mathcentral.uregina.ca](http://mathcentral.uregina.ca)