What can you gain from a degree in mathematics?

While you are working on your degree in mathematics you will be given opportunities to develop many skills. Some of these are specifically related to your field of study and some of them have relevance outside of it. Those skills that can be used in other contexts – such as the ability to solve problems, communicate well, learn quickly, organize your time – are called transferrable skills.

Although it may seem a long way off, chances are, that one day, degree in hand; you will be looking for a job. Your transferrable skills will be of particular interest to potential employers, who will not just be concerned with your performance in your subject, but in the overall contribution that you can make to their organization. If you can convince an employer that you can work well within a team, solve problems, organize, innovate, adapt, and so forth, you will outshine your competitors in the job market.

What follows is a list of eight skills, both transferable and subject-specific, that your Mathematics Degree can offer you.

Mathematical Skills

As a mathematics student you will study each of the major subject areas of modern mathematics: algebra, analysis, geometry, statistics, and applied mathematics. (The depth to which you will study any of these areas will vary.) In the course of this study you will learn:

1. The language of mathematics and the rules of logic.
2. How to state a mathematical idea precisely.
3. How to prove or disprove a mathematical conjecture.
4. How to extract meaning from mathematics on the written page.
5. How to use mathematics to describe the physical world.

Analytical Skills

Mathematics will enhance your ability to:

1. Think clearly.
2. Pay attention to detail.
3. Manipulate precise and intricate ideas.
4. Follow complex reasoning.
5. Construct logical arguments and expose illogical ones.

Problem Solving Skills

You will be given countless mathematical problems to solve over the course of your degree. Experiencing these will teach you to:

1. Formulate a problem in precise terms, identifying the key issues.
2. Present a solution clearly, making your assumptions explicit.
3. Gain insight into a difficult problem by looking at special cases or sub-problems.
4. Be flexible, and approach the same problem from different points of view.
5. Tackle a problem with confidence, even when the method of solution is not obvious.

Investigative Skills

During your studies you will sometimes find yourself trying to understand mathematics that seems too hard, and trying to solve problems that at first seem impossible. You may also be asked to do
essays and projects that involve you privately investigating an area of mathematics you know nothing about. To overcome this challenge you will find yourself:

1. Using your lecture notes, textbooks and reference books.
2. Scouring the library.
4. Extracting information from every mathematician you meet, particularly other undergraduates, postgraduates, tutors and lecturers.
5. Thinking!

Communication Skills

A mathematics degree will develop your capacity to assimilate and communicate highly technical information. During lectures you will be required to organize and record a mass of mathematical detail, both spoken and written. Homework exercises, and any essays and projects you do, will call for clear mathematical exposition. During supervisions you will find yourself exchanging mathematical ideas with your supervisor and fellow students. Through these experiences you will learn how to:

1. Listen effectively.
2. Write mathematics well.
3. Write essays and reports.
4. Give a mathematical presentation to a group.

IT Skills

Information Technology, which has come to mean `anything to do with computers'. During your degree you will have access to computing facilities. You will have the opportunity to:

1. Use e-mail and access the internet.
2. Learn a programming language.
4. Learn word-processing, of both text and mathematics.

Good Working Habits

To be a successful mathematics student you will have to:

1. Be thorough and painstaking in your work.
2. Organize your time and meet deadlines.
3. Work under pressure, especially near exam time.
4. Work independently, without constant support from teachers.
5. Work co-operatively with others to solve common problems.

Useful Personality Traits

Battling successfully with ideas that are hard to understand and problems that are hard to solve fosters:

1. Determination
2. Perseverance
3. Creativity
4. Self-confidence
5. Intellectual rigor
Career Opportunities

Many people believe that the only career open to a mathematics major is teaching. This is not the case, as our graduates with jobs in industry and government can certainly attest. Modern society has become intensely technological and, as a result, there are jobs awaiting anyone with solid training in mathematics. With this demand combined with Castleton’s strong Mathematics Department graduates are bound for success in the array of fields they may choose to enter into.

Studies have shown that the starting salaries of undergraduate mathematics majors are only slightly lower than those of engineers and are considerably higher than those of business, economics and accounting majors.

Castleton mathematics graduates in recent years have gone on to careers in a variety of business and industrial settings; others have entered graduate programs in medicine, law, economics and engineering, as well as in fields more closely related to mathematics. Many career paths are open to a mathematics major, only a few of which are mentioned below. For further information you should speak with one of the department faculty or consult the pamphlet "Professional Opportunities in the Mathematical Sciences", which is published by the Mathematical Association of America.

Academic Research

Research in pure mathematics is conducted primarily by college and university faculty. If a career in research mathematics and teaching at the college level appeals to you, you will need to attend graduate school and ultimately earn a Ph.D. in Mathematics. A Castleton degree is a good first step in this process. In fact, in recent years, Castleton produced several graduates who have gone on to seek a Ph.D. in Mathematics. The nature of research is such that it is vital for one to have a thorough background in theoretical and foundational areas. Thus, even if you want to pursue research in an applied area such as statistics or operations research, you will best prepare for graduate school by taking as much pure mathematics as you can during your undergraduate years.

Industry and Government

Career possibilities in industry include employment in scientific and engineering firms, as well as work in financial and management companies. In addition to a career in the private sector, there is also the possibility of government work. For a mathematics graduate, there are opportunities at government laboratories such as that in Los Alamos, NM, federal research centers, such as the Center for Naval Analyses and the Federal Reserve Bank, to name a few. Mathematics students are highly regarded by industry and government for their general problem-solving abilities, their analytical training, and their ability to think abstractly. Most companies are willing to provide some specific training on the job. In fact, some companies even prefer to do this, for then you may be more thoroughly indoctrinated into the company’s standard methodologies. Computer experience is very desirable for such a career, and some training in an area to which mathematics can be applied is useful. The best preparation, however, is a solid program in both pure and applied mathematics.

Actuarial Work

Actuaries evaluate the current financial implications of future contingent events. Sometimes called "social mathematicians", they project the financial effects that various human events--birth, sickness, accident, retirement, and death--have on insurance and other programs. Salaries are high in this profession and successful actuaries are in constant demand. Professional advancement in this field comes through passing a series of nine examinations administered by the Society of Actuaries and the Casualty Actuarial Society. The first of these examinations covers the calculus of one and several variables, differential equations, and probability. Questions on the examination are presented primarily in the context of risk management and insurance.
Pre-Collegiate Education

There is a very real and disturbing shortage of qualified mathematics teachers and mathematics supervisors in the nation's elementary and secondary schools. Castleton graduates typically have both the academic and the personal strengths to make a tremendous contribution in this field. To teach in the public schools, one must be certified; this means approximately a year of courses in mathematics education and practice teaching. Castleton entrants into the teaching field typically take this program at the post-graduate level, obtaining a master's degree in mathematics and/or education along with certification. A post-graduate year, or more, is strongly recommended as suitable grounding for the kind of leadership that Castleton graduates can expect eventually to exert in the field. Due to the above-mentioned personnel shortage, generous fellowships are often available. Work with school students within the mathematics program in the local schools is also available, usually for credit.

Another option is to begin teaching immediately upon graduation in a private school because certification is not required. One might plan on teaching for only a few years in a private school before going on with the next stage of their career, however, if they choose to remain in the private sector, post-graduate studies will be required. There are several placement services for teaching positions in private schools. With the help of these services, Castleton students have been very successful in finding placements. For additional information, see a member of the department, or consult the Office of Career Services.