

## WHICH MATHEMATICS QUALIFICATION IS SUITABLE FOR ME?

Continuing to study Mathematics is a fantastic choice because of the wide range of applications of the subject. If you gain a good pass in GCSE Mathematics by the end of Year 11 you should consider taking mathematics further.

Your options are:

- AS or A level Mathematics;
- A level Mathematics with AS or A level Further Mathematics;
- Core Maths.

**AS or A level Mathematics** supports the study of a wide range of other AS/A level subjects. Physics, Chemistry and Biology rely on good algebraic and graphical skills, statistical techniques and the use of a range of functions including logarithms and trigonometry. In addition, Economics, Psychology, Business, Computing and Geography all benefit from students having fluent and confident numerical, algebraic, graphical and statistical skills.

Many students take AS/A level Mathematics in conjunction with non-related subjects in order to maintain a broad range of subject choices until they make decisions about their future study and career plans.

Mathematics is a highly valued qualification by employers and universities and is one of the most popular subjects for both boys and girls. The vast range of degree courses and careers that require solid mathematical skills ensures that taking Mathematics to AS level or beyond will open doors to a world of opportunities!

**Further Mathematics** provides a great opportunity for enthusiastic mathematicians to broaden and deepen their subject knowledge.

If you plan to apply for a STEM (Science, Technology, Engineering and Mathematics) degree you should consider taking Further Mathematics to at least AS level. Further Mathematics is also a fantastic qualification for those students who love mathematics and want to devote more time to the studying wider aspects of the subject.

Sometimes AS Further Mathematics can be completed during Year 13 – ask your school or college.

If you are thinking of applying for a medical degree, consult individual university websites to check for any special rules relating to Further Mathematics.

**Core Maths** is a new Level 3 qualification which develops the mathematical skills gained at GCSE. It focuses on using and applying mathematics to solve problems drawn from other subjects, work and real life. The Core Maths course includes new content such as statistics, financial mathematics and using algebra. Core Maths helps with the mathematics needed for a broad range of other subjects.



## Mathematical Studies

The Level 3 Mathematical Studies (Core Maths) qualification will consolidate your mathematical understanding, building confidence and competence in applying mathematical techniques to solve a range of problems, as well as introducing new techniques and concepts in preparation for further study and future employment within a broad range of academic, professional and technical fields. Students will develop mathematical modelling, evaluation and reasoning skills to solve problems which will not be well defined and may not have a unique solution. You will be expected to develop your understanding, communication and enjoyment of mathematics through this course.

### Entry Requirements

No specific requirements.

### Where does this subject lead me?

Mathematical Studies aims to prepare students for the mathematical demands of higher education and work where there is a distinct mathematical or statistical element, but where the mathematical demands do not stretch to a requirement for A-level Mathematics. If you would like more information about this new course, please contact Mr D Sharpe, KS5 Coordinator in Mathematics or visit [www.aqa.org.uk/](http://www.aqa.org.uk/) and search for Level 3 Mathematical Studies.

### Exam Board

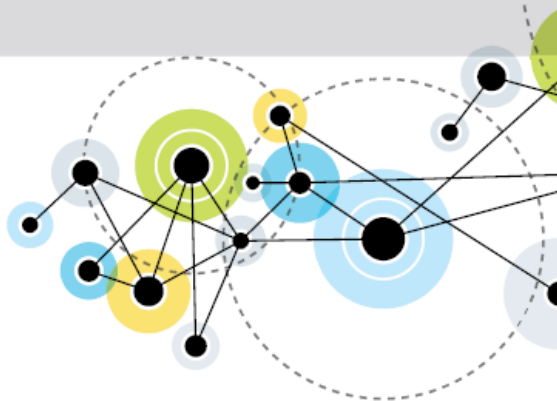
AQA

*This exciting new subject is for students who are studying courses with a Mathematical element, for example; Biology, Economics and Psychology. All of these subjects contain a level of data analysis. The certificate is not a full A-level and is only available as an addition to a 3 A-level package. Mathematical Studies is graded A-E.*

# AS AND A LEVEL MATHEMATICS

Mathematics can be taken at AS level or A level.

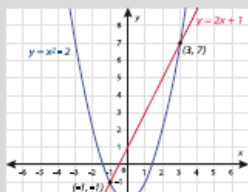
All students study the same mathematical content, which extends techniques covered at GCSE and introduces new methods and concepts.



AS and A level Mathematics courses further develop familiar mathematical topics learned at GCSE such as **algebra, co-ordinate geometry, trigonometry and probability**. New topics introduced at A level include: **sequences and series; differentiation and integration**, together known as calculus; **Newton's laws of motion**; and **statistical hypothesis testing**.

Students are expected to use technology such as graphical calculators, graphing software and spreadsheets throughout the course.

Students starting AS and A level Mathematics courses in September 2017 or later will take all examinations at the end of the course. AS examinations may be taken at the end of the first year (Year 12). The marks awarded for AS do not count towards the A level qualification taken at the end of the second year (Year 13).



All qualifications include the same content, covering three broad areas:

### Pure Mathematics

is the methods and techniques which underpin the study of all other areas of mathematics. This includes **proof, algebra, trigonometry, calculus, and vectors**.

### Mechanics

is the mathematics used to study the physical world, modelling the **motion** of objects and the **forces** acting on them. This includes **moments**, where the turning effect of a force is considered.

### Statistics

involves **statistical sampling, data presentation and probability**, all of which follow on from topics met at GCSE, leading to the study of statistical distributions with special properties, such as the **Binomial Distribution**.

# Mathematics



Mathematics encourages students to think logically and develop the skills and knowledge required for solving a wide range of practical or abstract problems. You will need to work hard and be determined to master the skills and techniques required by the course.

In Year 12, students develop their independent study skills throughout the course, extending their knowledge of algebra, trigonometry and sequences. Students are also introduced to the new concepts of differentiation and integration. In Year 13, students will learn how to model mechanical processes, apply new skills and techniques to more complex problems and continue to extend their algebraic knowledge and understanding.

## Entry Requirements

Grade 6 in Maths

## Where does this subject lead me?

Mathematics is a well-respected and sought after qualification for a wide variety of Higher Education courses; it is essential for a degree in mathematics or physics. Logical thinking and problems solving skills are highly valued in the work place and lucrative industries like IT, banking and the stock market need people confident in using mathematics on a daily basis.

## Exam Board

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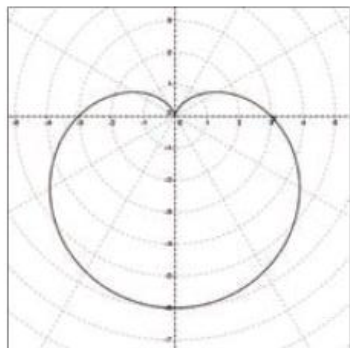
*Maths is an infinitely interesting subject and at Notre Dame Sixth Form it has a great department with passionate teachers who will give you an incredible amount of support, inside and outside of class, to help you achieve the grade you want. I personally believe Maths is an extremely important subject whether you want to study it at a degree level or not. It will definitely improve your learning in all of the science subjects and in many other subjects too. I would recommend studying Mathematics at Notre Dame to anybody who wishes to take up the challenge.*

Nicole Sears

*It will definitely improve your learning in all of the science subjects and in many other subjects too . . .*

## FURTHER MATHEMATICS

Further Mathematics can be taken at AS level or A level. It is a second qualification that can be taken in addition to A level Mathematics.

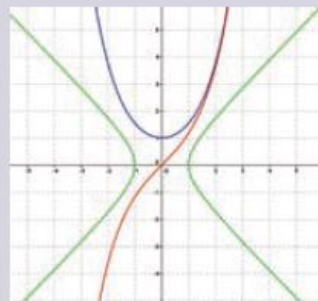


$$\begin{pmatrix} 2 & 3 & -1 \\ 0 & 1 & 1 \\ 3 & -2 & 0 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 2 \\ 5 \\ 9 \end{pmatrix}$$

All students study the same core mathematical content for Further Mathematics, which makes up 50% of the content for A level and 30% for AS level. There is some choice over the remaining content of each course which might include further study of pure mathematics, statistics, mechanics or other areas of mathematics. Individual schools and colleges will be able to provide more information about the structure and options available for the Further Mathematics course offered.

At AS, topic areas studied include **complex numbers**, which allow the solution of a range of equations that would otherwise have no solutions, through the introduction of 'imaginary' numbers, and **matrices** which consist of grids of numbers that can be used to represent transformations and are used to solve simultaneous equations amongst many other uses.

At A level, other areas of pure mathematics are covered such as **polar co-ordinates**, **differential equations** and **hyperbolic functions**. Each of these builds on earlier topics and encourages the development of a wider understanding of the ways in which mathematical topics are interconnected.



## Further Mathematics



Further Mathematics allows the study of a wider range of concepts and techniques in pure, mechanics and decision mathematics. You focus on solving abstract problems and applying practical methods in the areas of engineering, computing and project management. As it is an advanced level of study you need to be very interested in mathematics to consider taking this subject. Initially the course gives a breadth of study; learning further algebraic techniques and proof alongside mathematical modelling of real world situations and their optimal solutions. Later, students focus much more on extending their repertoire of analytical methods and developing their knowledge and understanding of pure mathematics.

### Entry Requirements

Grade 7 in Maths.

### Where does this subject lead me?

It is a greatly respected A-Level and fits well with almost any combination of subjects with a strong mathematical content. If you are considering a degree in mathematics, physics, engineering or computing at a highly competitive university you are strongly advised to study Further Mathematics.

### Exam Board

AQA

*I took Further Maths because I have a passion for Maths and want to study it at university. It is enjoyable as it pushes your mathematical skills forward by introducing new concepts and allows you to work with others who share a love of the subject. Additionally the Maths department is full of great teachers who are willing to help outside of lesson time. Further Maths is an A-Level which can truly lead you anywhere if you have a passion and commitment to the Maths.*

**Matthew Jermy**

*It is enjoyable as it pushes your mathematical skills forward by introducing new concepts . . .*



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- Calculation capability improvement.