



## What will I learn?

The skills developed by studying mathematics in the sixth form are highly valued by employees and universities across a wide range of careers from medicine and law to engineering and management. Mathematical skills aid the development of powers of analysis and strong problem solving skills.

Some of the aims of the specification are to encourage you to:

- develop your understanding of mathematics and mathematical processes in a way that promotes confidence and fosters enjoyment
- extend your range of mathematical skills and techniques and use them in more difficult unstructured problems
- use mathematics as an effective means of communication
- take increasing responsibility for your own learning and the evaluation of your own mathematical development.

## Highlights

As well as the opportunity to enter the national Senior Maths Challenge, we try to enter a team of four students for the Senior Team Maths Challenge.

## What are the recommended entry requirements?

Grade A at GCSE Maths is preferable.

## How will I be assessed?

In Year 12 you will take exams in Core 1, Core 2 and Statistics 1. In Year 13 the units are Core 3, Core 4 and Mechanics 1. Each of the six exams is one hour and 30 minutes long.

### Summary of subject content:

CORE 1	Surds, quadratics, simultaneous equations, factor theorem, graph sketching and transformations, coordinate geometry – lines and circles, calculus: differentiation and integration of polynomials
CORE 2	Algebra and functions, sequences and series, binomial theorem, trigonometry, exponentials and logarithms, further differentiation and further integration
CORE 3	Composite functions, modulus function, trigonometry, natural logarithms, differentiation using chain, product and quotient rules, integration by substitution and parts, numerical methods for solving equations
CORE 4	Partial fractions, parametric equations of curves, binomial series, trigonometry, exponential growth and decay, differential equations, vectors
STATISTICS 1	Numerical measures (standard deviation, linear scaling), probability, binomial distribution, normal distribution, confidence intervals, correlation and regression

MECHANICS 1	Mathematical modelling, kinematics in one and two dimensions, statics and forces, momentum, Newton's Laws of Motion, connected particles and projectiles
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### Maths and Further Maths

If you wish to study Maths **and** Further Maths, you will take six modules at AS and six at A2. Please note that you must take Further Maths in addition to Maths.

At the end of Year 12, in addition to the three AS Maths units, Further Mathematicians will take Further Pure 1, Decision 1 and Statistics 2. In Year 13 two of the units will be Further Pure 2 and Further Pure 3 and either Further Pure 4 or Mechanics 2 depending on the preference of the majority of the group.

### Summary of subject content: Further Mathematics

FURTHER PURE 1	Graphs of rational functions, complex numbers, roots and coefficients of a quadratic equation, series, evaluation of simple improper integrals, Numerical methods, general solutions of trigonometric equations, matrices and transformations
FURTHER PURE 2	Roots of polynomials, complex numbers, De Moivre's Theorem, proof by induction, finite series, the calculus of inverse trigonometrical functions, Hyperbolic functions, arc length and area of surface of revolution
FURTHER PURE 3	Maclaurin series, improper integrals, polar coordinates, solving differential equations – first and second order and using Euler's formula
FURTHER PURE 4	Vectors and three-dimensional coordinate geometry, matrix algebra, solution of linear equations, determinants, linear independence
DECISION 1	Simple Ideas of Algorithms, Graphs and Networks, Spanning Tree Problems, Matchings, Shortest Paths in Networks, Route Inspection Problem, Travelling Salesperson Problem, Linear Programming, Mathematical Modelling
STATISTICS 2	Discrete and continuous random variables, poisson distribution, confidence intervals, hypothesis testing, contingency table tests
MECHANICS 2	Moments and centre of mass, kinematics, application of differential equations, circular motion, work and energy

Most activities will be classroom based where you will work on solving increasingly complex problems. Independent study will be required outside of the classroom. Help is always available through drop-in support sessions.

### What are the costs?

Calculator

### Future Opportunities

Mathematics complements a wide variety of other A-level courses and in addition, Mathematics A-level provides an understanding of the mathematical tools and techniques that are an integral part of many degree courses.