Mathematics

Examination Board: AQA

Examination Code: 7357

Outline of the Course	A Level Maths is a stimulating and challenging course, which builds on many topics already met at GCSE. It develops key employability skills such as problem-solving, logical reasoning, communication and resilience; A Level Maths Supports the study of other A level subjects, including • *Sciences, Computing, Economics, Geography, Design Technology, Psychology* It also complements other A level subjects, adding breadth. The course provides excellent preparation for a wide range of university courses (it is essential for entry to many courses). Topics are studied in the following order, across two teachers: Teacher 1 (Pure Maths and Mechanics) 1. Quadratic Functions and Equations 2. Polynomial Functions 3. Graph Transformations 4. Coordinate Geometry 1 (Lines) 5. Differentiation 6. Coordinate Geometry 2 (Circles) 7. Integration 8. Vectors 9. Kinematics in One Dimension 10. Forces & Newton's Laws 11. Kinematics in Two Dimensions 12. Equilibrium & Resolving; Statics & Dynamics 13. Moments 14. Further Differentiation 15. Further Integration 16. Parametric Equations 17. Differential Equations Teacher 2 (Pure Maths and Statistics) 1. Surds & Indices 2. Trigonometry 1

3. Exponential Functions & Logarithms
4. Statistical Sampling
5. Data Presentation & Interpretation
6. Binomial Expansions
7. Algebraic Fractions
8. Proof
9. Probability
10. The Binomial Distribution
11. Statistical Hypothesis Testing 1
12. Trigonometry 2
13. Functions
14. Sequences & Series
15. The Normal Distribution
16. Statistical Hypothesis Testing 2
17. Numerical Methods

What will you learn?

Pure Mathematics (2/3 of the subject content)

Pure Maths develops the majority of material studied at GCSE, as well as introducing new ideas, such as Calculus:
Proof – Methods for constructing a convincing mathematical argument.
Algebra – Manipulation and applications throughout the course.
Graphs – Understanding properties of functions though their graphs.
Coordinate Geometry – Using coordinates to explore properties of shapes.
Trigonometry – Exploring the properties of trigonometric functions and the relationships between them.
Exponential Functions and Logarithms – Understanding and modelling exponential change.
Calculus – Differentiation and Integration and their applications, including finding a rate of change, optimisation problems, calculating the area under a graph, and forming and solving differential equations.
Sequences and Series – Rules for Arithmetic and Geometric progressions and finding the sum of terms in a series.
Numerical Methods – Using efficient methods to solve problems that can't be solved using analytical algebraic methods.
Vectors – Understanding two- and three-dimensional space.

Mechanics (1/6 of the subject content)

Mechanics models the motion of objects and the forces acting on them. There are close links here with aspects of Physics.
Kinematics – Relationships between displacement, velocity and time, including acceleration.
Statics – Forces when an object remains at rest.
Dynamics – Forces when an object is not at rest and the motion that is caused.

Statistics (1/6 or the subject content)

Statistics develops GCSE work on collecting and analysing data, and probability:
Sampling – Methods for collecting data.
Numerical Measures – Calculating and interpreting averages and measures of spread, including standard deviation.
Representing Data – Interpreting tables and diagrams.
Probability – Extending GCSE work on probability and likelihood, including simple discrete and continuous distributions, such as the Binomial and Normal Distributions.
Hypothesis Testing – Determining whether observations within data are due to coincidence or whether there are influencing factors.

Mark Breakdown and Assessment

Assessment is by three 2-hour written examinations, all taken at the end of the course in Year 13, with equal weighting of 33⅓% for each:

Paper 1

What's assessed
Any content from:
- A: Proof
- B: Algebra and functions
- C: Coordinate geometry
- D: Sequences and series
- E: Trigonometry
- F: Exponentials and logarithms
- G: Differentiation
- H: Integration
- I: Numerical methods

How it's assessed
- Written exam: 2 hours
- 100 marks
- 33⅓ % of A-level

Questions
A mix of question styles, from short, single-mark questions to multi-step problems.

Paper 2

What's assessed

Any content from Paper 1 and content from:

- J: Vectors
- P: Quantities and units in mechanics
- Q: Kinematics
- R: Forces and Newton's laws
- S: Moments

How it's assessed

- Written exam: 2 hours
- 100 marks
- 33⅓ % of A-level

Questions

A mix of question styles, from short, single-mark questions to multi-step problems.

Paper 3

What's assessed

Any content from Paper 1 and content from:

- K: Statistical sampling
- L: Data presentation and interpretation
- M: Probability
- N: Statistical distributions
- O: Statistical hypothesis testing

How it's assessed

- Written exam: 2 hours
- 100 marks
- 33⅓ % of A-level

Questions

A mix of question styles, from short, single-mark questions to multi-step problems.

Calculators may be used on all papers. We recommend the Casio fx991 CW calculator. Graphical calculators are allowed in the examinations (and allow students to explore mathematical functions independently), but these are not essential for the course.

Website links

Specification:
https://www.aqa.org.uk/subjects/mathematics/a-level/mathematics-7357/specification

The Advanced Maths Support Programme:
https://amsp.org.uk/students/

Key Dates	Exams: May/June Year 13
Further Information	Mr C. McAvoy (Curriculum Leader for Mathematics) Mrs C. Mycock (Second in Department) Mr S. Ahmad (Subject Teacher for Maths) Mrs K. Carter (Subject Teacher for Maths and Assistant Head of Sixth Form) Mr. O. Chadbond (Subject Teacher for Maths) Mrs M. Ezzy (Subject Teacher for Maths) c.mcavoy@stretfordgrammar.com
What can I do after I have completed the course?	If you've taken A level Mathematics, you'll have a wide range of options for further study and employment. If you enjoy maths, you might like to consider taking a degree in it. Maths can be studied as a single subject BSc honours degree or as a combined/joint honours degree with another subject. Some courses include an optional work placement year to gain experience in industry, and some include the option to study abroad. Maths can also be studied as an MMath degree – a four-year degree in which the final year is at masters level. Degrees other than Mathematics can also involve studying maths at a high level, including Engineering, Physics, Chemistry, Biology, Computer Science, Geography and Economics. A Level Maths can be an essential requirement for many courses. Mathematical skills (in particular the ability to think and work logically, or to analyse information) are desirable in a wide range of other occupations and activities, including the social sciences, humanities and the creative arts. See also: https://amsp.org.uk/students/studying-a-level-mathematics/whats-next/