

### Course Outline

The course will prepare students to progress into further education to follow courses in mathematics, STEM (Science, Technology, Engineering and Mathematics), finance, economics, or other related subjects. For students not set on a STEM career, A-Level Mathematics can open doors to other fields such as the social sciences, economics, business and humanities.

### What will I learn on this course?

You will gain a deeper understanding of pure mathematics, including algebra, calculus, trigonometry, and geometry, as well as the applied mathematics fields of mechanics and statistics. You will develop problem-solving skills, learn to apply mathematical techniques to real-world situations, and enhance your logical and analytical thinking.

### Who would be a successful student of mathematics?

This course will appeal to students who

- enjoy the rigor and precision of mathematical reasoning and solving problems
- have a strong analytical mind
- are logical thinkers
- are willing to work hard to grasp complex concepts.

Successful students have at least a Grade 7 in GCSE Mathematics, have a willingness to try a variety of approaches and the tenacity to keep going in the hunt for possible answers to awkward problems. Although mathematics is highly logical, it also requires imagination, resilience and determination to do well.

### Career Opportunities

Universities, businesses, and organisations often prefer candidates with an A-Level in Mathematics due to the valuable problem-solving, analytical, and quantitative skills it develops. These skills are highly transferable and applicable across various fields, making individuals with A-Level Mathematics more adaptable and attractive to employers.

Employers today actively seek out people who can prove their ability to think logically, understand complex ideas and apply them to the real world. If you want a career in STEM, business and finance, the media, education, a host of other fields, mathematics can help give you the edge.

### Course Structure

Pure mathematics forms two-thirds of the course and includes the topics of algebra and functions, trigonometry, sequences and series, calculus (differentiation and integration), and logarithms.

Applied mathematics forms one third of the course. Mechanics focuses on the mathematical modeling of physical systems, including forces, motion, and energy. Statistics covers the collection, analysis, and interpretation of data, including probability and statistical distributions.

#### Pure Mathematics

- **Algebra:** Expanding on GCSE algebra, students will delve into more complex equations, inequalities, functions, and their graphs.
- **Calculus:** Introducing the concepts of differentiation and integration, which are fundamental for understanding rates of change and accumulation.
- **Trigonometry:** Furthering the study of trigonometric functions, identities, and their applications.
- **Coordinate Geometry:** Exploring geometric concepts in a coordinate plane, including vectors.
- **Sequences and Series:** Studying patterns in sequences and series, including arithmetic and geometric progressions.

#### Applied Mathematics

**Mechanics:** This component applies mathematical principles to the study of motion and forces including

- **Kinematics:** Describing motion using concepts like displacement, velocity, and acceleration.
- **Forces and Motion:** Analyzing how forces affect the motion of objects, including concepts like Newton's laws of motion.

**Statistics:** This component focuses on the analysis and interpretation of data including

- **Data Collection and Representation:** Understanding different methods of collecting and presenting data, including various statistical diagrams.
- **Probability:** Exploring the concepts of probability, including probability distributions and hypothesis testing.
- **Statistical Inference:** Learning how to draw conclusions and make predictions based on statistical data.