

RMGS MATHEMATICS and FURTHER MATHEMATICS

A LEVEL

What are the aims of the course?

Students will be encouraged to

- ✓ develop their understanding of mathematics and mathematical processes in a way that promotes confidence and fosters enjoyment
- ✓ develop ability to reason logically and recognise incorrect reasoning, to generalize and to construct mathematical proofs
- ✓ extend their range of mathematical skills and techniques and use them in more difficult, unstructured problems
- ✓ develop an understanding of coherence and progression in mathematics and of how different areas of mathematics can be connected
- ✓ recognise how a situation may be represented mathematically and understand the relationship between *real world* problems and standard and other mathematical models and how these can be refined and improved
- ✓ use mathematics as an effective means of communication
- ✓ read and comprehend mathematical arguments and articles concerning applications of mathematics

What does it involve?

Pure Mathematics This extends GCSE work in algebra, coordinates and trigonometry whilst introducing new ideas and techniques, such as calculus, in abstract mathematical theory and the ideas of proof. The ideas met in pure mathematics have an interest of their own but they also serve as an important foundation for the applications.

Mechanics This is a mathematical model in which systems of forces are analysed and the motion of bodies is considered by developing ideas such as acceleration, energy and momentum, which may have been met in Physics. Many of the ideas met in the course form an essential introduction to cybernetics, robotics, bio-mechanics and sports science as well as engineering and physics.

Statistics This develops the ideas of probability and statistics met in GCSE mathematics, progressing to the modelling of real life situations with probability and the analysis of real life data in statistics. Many of the techniques are used in science and in the social sciences as well as being used to analyse car insurance costs and finding out how likely it is that the earth will be hit by a comet in the next ten years.

Decision Mathematics (only for further mathematics students) In business and commerce there are many situations in which a decision has to be made requiring a different problem solving approach, such as *How to plan a job to make the most efficient use of the time and skills of workers, whilst at the same time maximizing profits?* The advances in computer technology have allowed mathematicians to develop methods to solve such problems. This is Decision Mathematics.

For A level Mathematics two thirds of the work will be Pure Mathematics. The other third will be part Mechanics and part Statistics.

For A level Further Mathematics half of the work will be Pure Mathematics. The other half will be two of Mechanics, Statistics, Decision Mathematics or more Pure Mathematics.

Further Mathematics is an extra A level. Students studying Further Mathematics must also study Mathematics so they will have two qualifications in Mathematics. Further Mathematics is a harder subject than Mathematics, but this is recognised by universities as a harder qualification.

How is it assessed?

Mathematics A Level – Year 13 Two 2 hour exams in Pure Mathematics and one 2 hour exam in Statistics and Mechanics

Further Mathematics A Level – Year 13 Two 90 minute exams in Further Pure Mathematics and two 90 minute exams in two of either Further Pure, Further Statistics, Further Mechanics or Decision Mathematics.

Are there any specific entry requirements?

Students who wish to take Mathematics in the sixth form should have achieved at least a level 7 in their GCSE Mathematics exam.

Students who wish to take Further Mathematics in the sixth form should have achieved at least a level 8 in their GCSE Mathematics exam.

For both Mathematics and Further Mathematics student must have passed the Rainham Mark Mathematics aptitude test for A level Mathematics and achieved at least a level 7 (level 8 for Further Mathematics) in the algebra part of their GCSE Mathematics exam.

Why is it a useful qualification?

Mathematics can be enjoyable and worth studying in its own right as well as being a supporting subject for the physical and social sciences but is it worth the effort as it is not an easy subject? There is evidence to suggest that students who apply to University to study subjects such as Economics are given more favourable offers if they are studying A level Mathematics. Mathematics at A level is necessary for many Economics degree courses. Also research carried out at the LSE has found that there is a high wage premium (up to +11%) associated with having studied Mathematics at A level. Mathematics imparts those skills which directly increase productivity in the work place such as the ability to think logically and to solve complex problems. Success in Mathematics also shows that the student possesses essential qualities such as determination and perseverance.

An essential part of mathematics study is the challenge of analysing and solving a problem and the satisfaction and confidence gained from achieving a 'correct' answer. There are no essays to write but solutions will need to be communicated mathematically. Mathematics is not about learning facts. You will not be successful only by reading a book or learning notes but by actually doing mathematics.

Other areas for which A level mathematics is important include medicine, architecture, banking, stock market, accountancy, insurance, computing and ICT. Some would say that mathematics is the new lingua franca of commerce, business and even journalism.