



CITY OF LONDON ACADEMY

ISLINGTON

WHERE STUDENTS SUCCEED

# Mathematics

## **A Level Mathematics:**

### **Why choose this subject?**

This subject is for students who have enjoyed the mathematics they have already undertaken at GCSE and wish to extend their current understanding of the subject. The new style A-Level is similar in style to the new GCSE examinations, focusing on problem solving, application of knowledge, reasoning and proof.

This is a desirable qualification especially for student who want to study a degree in a mathematically-rich subject area such as Mathematics, Engineering, Science, Computing, Finance, Economics as well as a number of other degrees.

### **What Will I Be Studying?**

The course consists of 3 elements, Pure Mathematics (66.66%), Statistics and Mechanics (33.33%). The aims and objectives of the qualification are to enable students to; extend their range of mathematical skills and techniques, use their knowledge to make logical and reasoned decisions in solving problems in a variety of contexts; generalize mathematically and construct mathematical proofs.

### **Entry Criteria**

To study A-Level mathematics students are expected to have achieved a minimum of a grade 7 at GCSE.

### **How will I be assessed?**

The assessment of the course consists of sitting 3 external examinations in May/June, all at the end of year 13. Each paper is 3 hours long with 100 marks accounting for 33.33% of the qualification.

### **Papers 1 and 2 – Pure Mathematics**

The topics assessed in this examination are;

Proof, Algebra and Functions, Coordinate geometry in the (x,y) plane, Sequences and series, Trigonometry, Exponentials and logarithms, Differentiation, Integration, Numerical methods and Vectors

### **Paper 3 – Statistics and Mechanics**

The topics assessed as part of the Statistics part of the course are; Statistical sampling, Data presentation and interpretation, Probability, Statistical distributions and Statistical hypothesis testing

The topics assessed as part of the Mechanics part of the course are; Quantities and unit in mechanics, Kinematics, Forces and Newton's laws and Moments

## Over-arching theme 1 | Mathematical argument, language and proof

	Knowledge/skill
OT1.1	Construct and present mathematical arguments through appropriate use of diagrams; sketching graphs; logical deduction; precise statements involving correct use of symbols and connecting language, including: constant, coefficient, expression, equation, function, identity, index, term, variable.
OT1.2	Understand and use mathematical language and syntax as set out in the content.
OT1.3	Understand and use language and symbols associated with set theory, as set out in the content. Apply to solutions of inequalities and probability.
OT1.4	Understand and use the definition of a function; domain and range of functions.
OT1.5	Comprehend and critique mathematical arguments, proofs and justifications of methods and formulae, including those relating to applications of mathematics.

## Over-arching theme 2 - Mathematical problem solving

	Knowledge/skill
OT2.1	Recognise the underlying mathematical structure in a situation and simplify and abstract appropriately to enable problems to be solved.
OT2.2	Construct extended arguments to solve problems presented in an unstructured form, including problems in context.
OT2.3	Interpret and communicate solutions in the context of the original problem.
OT2.4	Understand that many mathematical problems cannot be solved analytically, but numerical methods permit solution to a required level of accuracy.
OT2.5	Evaluate, including by making reasoned estimates, the accuracy or limitations of solutions, including those obtained using numerical methods.
OT2.6	Understand the concept of a mathematical problem-solving cycle, including specifying the problem, collecting information, processing and representing information and interpreting results, which may identify the need to repeat the cycle.
OT2.7	Understand, interpret and extract information from diagrams and construct mathematical diagrams to solve problems, including in mechanics.

## Over-arching theme 3 – Mathematical modelling

	Knowledge/skill
OT3.1	Translate a situation in context into a mathematical model, making simplifying assumptions.
OT3.2	Use a mathematical model with suitable inputs to engage with and explore situations (for a given model or a model constructed or selected by the student).
OT3.3	Interpret the outputs of a mathematical model in the context of the original situation (for a given model or a model constructed or selected by the student).
OT3.4	Understand that a mathematical model can be refined by considering its outputs and simplifying assumptions; evaluate whether the model is appropriate.
OT3.5	Understand and use modelling assumptions.