

VI

Hartismere  
College



Further  
Mathematics



# **A STUDENT'S GUIDE TO THE AS/A LEVEL IN FURTHER MATHEMATICS**

## **What do I need to know or be able to do before taking this course?**

Students must select A Level mathematics as an option in year 12 and must have achieved a grade 8 or 9 at GCSE mathematics.

## **What will I learn on the AS level course?**

The course involves the study of more challenging themes in pure mathematics. Further mathematics includes options for further study in mechanics, statistics or decision mathematics.

Assessment is by examination at the end of year 12 for the AS in mathematics and at the end of year 13 for A level mathematics. The AS is a standalone qualification and it does not contribute to the final A level exam. At Hartismere, we study Edexcel Further Mathematics, at A level.

## **What kind of student is this course suitable for?**

Further mathematics is stimulating, exciting and very challenging. It is suitable for students with a strong mathematical background and passion for the subject. An A level in further mathematics is highly desirable for students who may wish to study mathematics, the physical sciences, engineering or economics.

## The course structure and assessment.

### AS Mathematics

**Paper 1: Further Pure Mathematics 1**  
**Written examination: 1 hour and 30 minutes**  
**50% of the qualification**  
**75 marks**

Content overview  
Proof, Complex numbers, Matrices, Further algebra and functions,  
Further calculus, Further vectors

**Paper 2: Further Mathematics Options**  
**Written examination: 1 hour and 30 minutes**  
**50% of the qualification**  
**75 marks**

Content overview  
Students take one of the following four options:

2A: Further Pure Mathematics 2 - Complex numbers, Further algebra and functions, Further calculus, Polar coordinates, Hyperbolic functions, Differential equations

2B: Further Statistics - Linear regression, Statistical distributions (discrete), Statistical distributions (continuous), Correlation, Hypothesis testing, Chi squared tests

2C: Further Mechanics - Momentum and impulse, Collisions, Centres of mass, Work and energy, Elastic strings and springs

2D: Decision Mathematics - Algorithms and graph theory, Algorithms on graphs, Algorithms on graphs II, Critical path analysis, Linear programming

## A level Further Mathematics

### **Paper 1: Further Pure Mathematics 1 (\*Paper code: 9FM0/01)**

**Written examination: 1 hour and 30 minutes**

**25% of the qualification**

**75 marks**

Content overview

Proof, Complex numbers, Matrices, Further algebra and functions, Further calculus, Further vectors

### **Paper 2: Further Pure Mathematics 2 (\*Paper code: 9FM0/02)**

**Written examination: 1 hour and 30 minutes**

**25% of the qualification**

**75 marks**

Content overview

Complex numbers, Further algebra and functions, Further calculus, Polar coordinates, Hyperbolic functions, Differential equations

### **Paper 3: Further Mathematics Option 1 (\*Paper codes: 9FM0/3A-3D)**

**Written examination: 1 hour and 30 minutes**

**25% of the qualification**

**75 marks**

Content overview

Students take one of the following four options:

3A: Further Pure Mathematics 3 - Further calculus, Further differential equations, Coordinate systems, Further vectors, Further numerical methods, Inequalities

3B: Further Statistics 1 - Linear regression, Statistical distributions (discrete), Statistical distributions (continuous), Correlation, Hypothesis testing, Chi squared tests

3C: Further Mechanics 1 - Momentum and impulse, Collisions, Centres of mass, Work and energy, Elastic strings and springs

3D: Decision Mathematics 1 - Algorithms and graph theory, Algorithms on graphs, Algorithms on graphs II, Critical path analysis, Linear programming.

**Paper 4: Further Mathematics Option 2**  
**Written examination: 1 hour and 30 minutes**  
**25% of the qualification**  
**75 marks**

Content overview

Students take one of the following seven options:

4A: Further Pure Mathematics 4 - Groups, Further calculus, Further matrix algebra, Further complex numbers, Number theory, Further sequences and series

4B: Further Statistics 1 - Linear regression, Statistical distributions (discrete), Statistical distributions (continuous), Correlation, Hypothesis testing, Chi squared tests

4C: Further Statistics 2 - Probability distributions, Combinations of random variables, Estimation, Confidence intervals and tests using a normal distribution, Other hypothesis tests and confidence intervals, Other hypothesis tests and confidence intervals, Probability generating functions, Quality of tests and estimators

4D: Further Mechanics 1 - Momentum and impulse, Collisions, Centres of mass, Work and energy, Elastic strings and springs

4E: Further Mechanics 2 - Further kinematics, Further dynamics, Motion in a circle, Statics of rigid bodies, Elastic collisions in two dimensions

4F: Decision Mathematics 1 - Algorithms and graph theory, Algorithms on graphs, Algorithms on graphs II, Critical path analysis, Linear programming

4G: Decision Mathematics 2 - Transportation problems, Allocation (assignment) problems, Flows in networks, Dynamic programming, Game theory, Recurrence relations, Decision analysis

## CAREER POSSIBILITIES

Students who study mathematics and further mathematics are much better prepared for degree courses with a high mathematical content, such as engineering, information technology, science & of course maths itself. The first year of study at university will be a lot easier if you have done at least an AS level in further mathematics. In addition, the study of further mathematics will improve your ability to understand the 'A' level maths course and give you a better chance of achieving a high grade.

The study of maths develops powers of analytical and logical thought. These are skills that employers seek in new graduates. Graduates in maths and maths related subjects are therefore always in high demand not just in the obvious fields of science and maths but also in banking, government, engineering and in industry in general.

### What the students say.....

*I was very happy I'd taken further when I got to university because it meant I'd already covered much of the maths I was taught in the first semester; this certainly took pressure off the more mathematical modules. Also, the lessons were a lot of fun, even when the maths was very hard.*

*Lani.W 1<sup>st</sup> Year Engineering student, Bath University*

*"Challenging at times but outstanding teachers helped to make it manageable and it was fun."*

*Tom. A 1<sup>st</sup> Year Mathematics Student, Loughborough University*

*"This is for students that want to go into a STEM field. It teaches you more rigorously how to solve problems and the deeper thinking behind how things relate to each other. Lessons are always fun and thought provoking, structured to work on solving questions in groups." – Maks.M Year 12*

*It is nice taking both maths and further maths because there are lots of crossovers, so it gives you a good understanding of the subject. I love further maths - we do a lot of mathematics - but the lessons can actually be really fun so that helps with motivation to do the subject. – Abi.H Year 12*

## Contact

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