



Queen Elizabeth Grammar School
Wakefield

Technical Information

A-level

A-level Course Title	Unit Code	Awarding Body
A-level Further Mathematics	9FM0	Edexcel

A-level Examinations:

Name	Method of Assessment	Marks
Paper 1: Further Pure Mathematics 1	1 hour 30 mins	75 marks
Paper 2: Further Pure Mathematics 2	1 hour 30 mins	75 marks
Paper 3: Further Mathematics Option 1 – Further Pure – Further Statistics – Further Mechanics – Decision Maths	1 hour 30 mins	75 marks
Paper 3: Further Mathematics Option 2 – Further Pure – Further Statistics – Further Mechanics – Decision Maths	1 hour 30 mins	75 marks

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Course Guide

A-level Further Mathematics

Further Mathematics

Background Knowledge and Qualifications

You will be expected to have achieved at least a grade 7 in your GCSE, although 8 or 9 is preferable as Further Mathematics is a very challenging course. You may only choose Further Mathematics, usually as a fourth subject choice, if you are also opting to study Mathematics.

Course Description

Further Mathematics includes the pure and applied topics from the Mathematics A-level which are explored at greater depth as well as introducing new concepts.

While studying Further Mathematics you will be expected to:

- use mathematical skills and knowledge to solve problems
- solve more complicated problems by using mathematical arguments and logic. You will also have to understand and demonstrate what is meant by proof in mathematics
- simplify real life situations so that you can use Mathematics to explore and model what is happening and what might happen in different circumstances
- use the mathematics that you learn to solve problems that are given to you in a real-life context
- use calculator technology and other resources (such as the internet, formulae booklets or statistical tables) effectively and appropriately; use graphical and geometrical software; understand when not to use such technology and its limitations

What kind of things do I do on this course?

Further Pure Mathematics

When studying Further Pure Mathematics at A-level you will be extending your knowledge of such topics as algebra, trigonometry, calculus and logarithms as well as learning some new ideas such as complex numbers, polar coordinates, formal mathematical proof, differential equations and matrices. If you genuinely get a 'bit of a thrill' out of solving mathematical problems, then you should find the prospect of this course very appealing. If you are interested in studying mathematics for its own sake, and you want to see 'just how deep the rabbit hole goes', then this is the course for you! Although many of the ideas you will meet in Further Mathematics are interesting in their own right, they also serve as an important foundation for other branches of Mathematics.

Decision Mathematics

This looks, amongst other things, at how to solve problems involving networks (e.g. computer, road, rail and telephone networks). Problems might include finding the shortest route by road from one city to another or perhaps the cheapest way of laying telephone cables to connect towns. You meet a range of methods, or algorithms, which enable such problems to be tackled.

Other topics include optimisation – finding the most efficient solution to the problem – and employ methods which are applicable to many real world situations. There are important applications of decision mathematics in a broad range of disciplines; from electronic circuits to the scheduling of tasks in the construction industry, from computer science to logistics.

Further Mechanics

When you study mechanics you will learn how to describe the motion of objects and how they respond to forces acting upon them, from cars in the street to satellites revolving around a planet. You will learn the technique of mathematical modelling; that is, of turning a complicated physical problem into a simpler one that can be analysed and solved using mathematical methods. The ideas used in mechanics form an essential foundation to the more complex situations encountered by, among others, engineers, architects, physicists and sports scientists.

Further Statistics

Statistics is of importance to everyone who wants to be able to look critically at numerical information and not be misled. Statistics models real world problems and then seeks to analyse these using mathematical techniques.

Such problems include finding ways to make a business more profitable right through to improving living standards and fighting cancer. You will look at techniques to interrogate large data sets using ICT which is a valuable skill in the modern age of "big data" Statistics involves: investigative questioning, designing ways to collect data to answer those questions, collecting data, and making sense of what that data says to produce reliable answers. You will encounter more sophisticated ways of processing and analysing data. Many of the ideas you will meet in the course form an essential introduction to such important modern fields of study as actuarial science, biology and chemistry, econometrics, cybernetics, robotics, climatology, biomechanics and sports science, as well as the more traditional ideas of engineering and physics.

Use of Course and Qualification

An A-level in Further Mathematics is a much sought after qualification for entry to a wide variety of full-time courses in Higher Education. There are also many areas of employment that see a Further Mathematics A-level as an important qualification and it is often desirable for the vocational qualifications related to these areas. Some Higher Education courses or careers that either require A-level Mathematics or for which it might be highly beneficial include:

- Physics
- Engineering
- Architecture
- Surveying
- Computing and Computer Science
- Natural Sciences
- Medicine
- Climatology
- Information Technology
- Economics
- Actuarial Science
- Insurance
- Accountancy
- Other Finance Related Courses
- Teaching and Education
- Operational Research
- Communication
- Logistics
- Psychology
- Environmental Studies
- Civil Service and Public Sector

If you wanted to continue your study of Mathematics after A-levels you could follow a course in Mathematics and/or Statistics at degree level or even continue further as a postgraduate and get involved in mathematical research.

Student Testimonials

Year 13 Mathematics Student
Proposed Course: Financial Mathematics

A-level mathematics offers a strong base for any logical degree course. The satisfaction gained from completing a maths qualification surpasses expectation due to its challenging nature.

Year 13 student
Proposed University Course: Mathematics

The combination of Mathematics and Further Mathematics help you develop essential time management and logical skills. As I am hoping to enter a challenging profession, I have learnt how to cope with a large workload.

