Further Mathematics (AQA)

A Level Further Mathematics

Why study A Level further mathematics
Further Mathematics best supports students wanting to take a Mathematics, Physics or Maths/Science based degree. You will study Pure Mathematics in depth, covering topics that could be in the first year of a mathematics degree and will broaden the breadth and depth of the Applied areas.
We also offer STEP Mathematics for those students who want to further their love and enthusiasm for maths through tackling less structured and more problem solving questions.

Content and Assessment
A Level Further Mathematics is examined over 3 separate exams which are all sat at the end of the 2 year course. Each exam is 2 hours long and requires the use of a calculator. The first 2 exams are compulsory units and are entirely assessing the Pure Mathematics content. They are both worth 100 marks each. For the third exam you will be taught and examined on just two of the following three applied areas: Mechanics, Discrete and Statistics. This third exam will be made up of 2 papers (one on each area) and will be worth 50 marks each. You will be expected to answer every question and the exam will require the good use of a calculator and therefore we will recommend which calculator you use. Your calculator must include the following features: an iterative function and the ability to compute summary statistics and access probabilities from standard statistical distributions.

Pure Mathematics (two thirds of the course)
Students will study all of the following topics: proof, complex numbers, matrices, further algebra and functions, further calculus, further vectors, polar coordinates, hyperbolic functions, differential equations, trigonometry, coordinate geometry.

Two of the following Applied Areas (one third of the course):

Statistics (one sixth of the course)
The topic areas in statistics are Discrete random variables and expectation, poisson distribution, Type I and Type II errors, continuous random variables, Chi tests for association.

Mechanics (one sixth of the course)
The topic areas in Mechanics are dimensional analysis, momentum and collisions, work, energy and power, circular motion, centres of mass and moments.

Discrete (one sixth of the course)
The topic areas in Discrete are graphs, networks, network flows, Linear programming, critical path analysis, game theory for zero-sum games and binary operations and group theory.

Teaching
The classes will be smaller than GCSE, on average about 20 students. There will be many challenging activities, opportunities to work in groups, use of ICT, activities that test a deeper understanding and consolidation exercises. There is more emphasis on working independently and you will be expected to regularly attend study support at lunchtimes .

The Future
A recent report by the Centre for Economic Performance said that young people with A Level Further Mathematics earn ten percent more than their Mathematically challenged counterparts. A shortage of highly numerate candidates in the jobs market means employers pay a premium for problem solving and number crunching skills of A Level Further Mathematicians. Further Mathematics A Level would be applicable for many courses and careers, such as Mathematics, Physics, Engineering, Computing, Accountancy. Moreover, these experiences in the broad range of mathematics, ranging from pure mathematics through to applied areas, will undoubtedly give you a strong foundation on which to pursue a mathematics degree or a mathematical based degree at a prestigious university.

Independent Learning

Independent learning tasks in Further Mathematics

1. Use the websites that the school subscribes to, (www.mymaths.co.uk, www.mathsnetalevel.com, www.meiresources.org) to work on additional questions for the topic you are currently studying in class or to revise past topics. Make a note of questions that you find particularly challenging and regularly revisit them.	
2. Collect a selection of past papers from MB26. Cut out the questions and sort them by type (use the objectives for each unit from your handbook to help you). It is a valuable activity to just classify the question by determining what the question is asking you to do as this is something you will have to do quickly in the exam.	
3. Write a set of instructions/flow diagram for solving questions of a particular type. (e.g. solving questions that require you to find the equation of a straight line). These will prove invaluable at revision time. Designing a flow diagram questions on a specific topic will help you appreciate all the different ways in which a particular method can be applied.	
4. Imagine one of your friends has missed a lesson. Prepare a 'lesson plan' that you could deliver to your friend to teach that covers a specific objective. For example, how to differentiate a polynomial of the form $y = ax^n$. Make sure that you include explanation, activities, questions, solutions and a homework!	
5. Create an activity similar to the ones we do in class: odd one out, matching, dominoes, hexagonal jigsaw etc. Use the questions from the textbook, doing each question so that you have the answer, or create your own questions. Don't forget to do your activity, or get a friend to do it, to check that it works.	
6. Read the 'Sexy Maths' column in The Times. Follow Marcus du Sautoy on Twitter. Read books about mathematics – not textbooks but books that highlight the beauty and fascinating nature of mathematics. (see http://math-blog.com/2007/07/17/ten-must-read-books-about-mathematics/) Immerse yourself in mathematics!	
7. Try some of the problems from www.nrich.maths.org You can search the problems by topic so try to solve a selection of problems on topics that you have covered in the course to deepen your understanding of how to apply the methods.	