amsp®

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NOTRE DAME HIGH SCHOOL

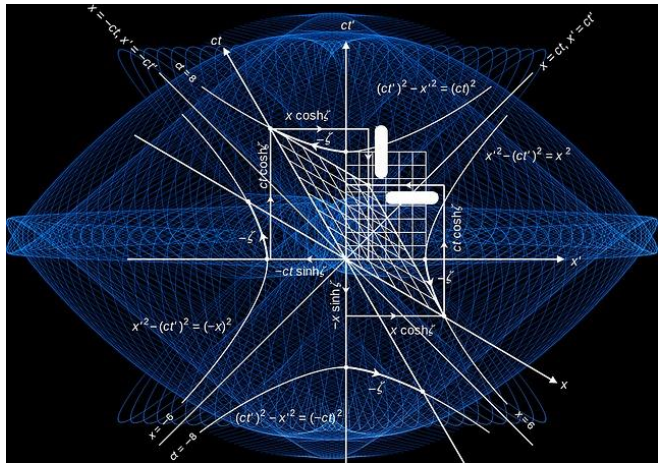
NDHS

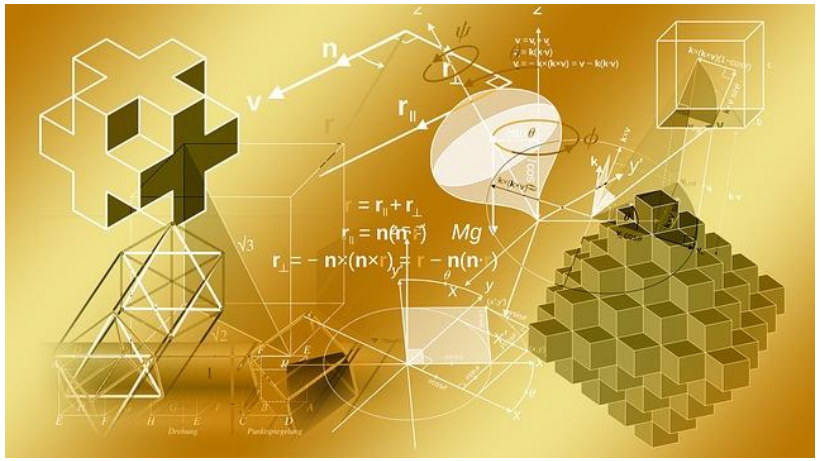
SURREY ST., NORWICH, NR1 3PB

MATHEMATICS

What is Further Mathematics?

Further Mathematics is an additional A level qualification taken **in addition to** an A level in Mathematics.





It is designed to stretch and challenge mathematic students and prepare them for university courses in mathematics and related quantitative and scientific subjects.

What is covered in Further Mathematics?

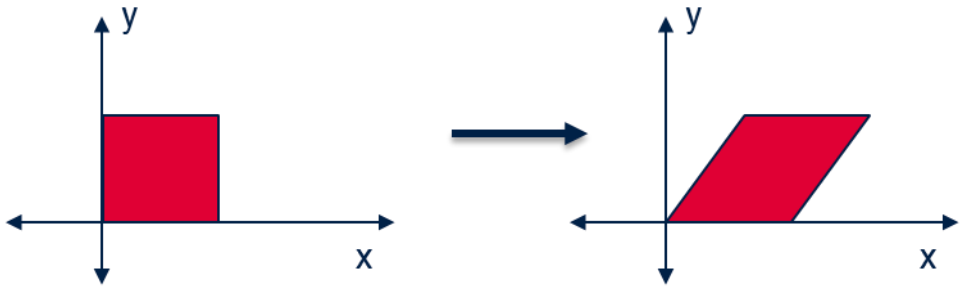
A level

Further Pure Mathematics (66%)	Further Mechanics (17%) and Discrete Mathematics (17%)

Pure maths in Further Mathematics

Two examples of important Further pure topics are complex numbers and matrices.

Matrices are arrays of numbers such as $\begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$. They can be used to solve sets of simultaneous equations and to represent transformations such as the shear shown in the diagram below.

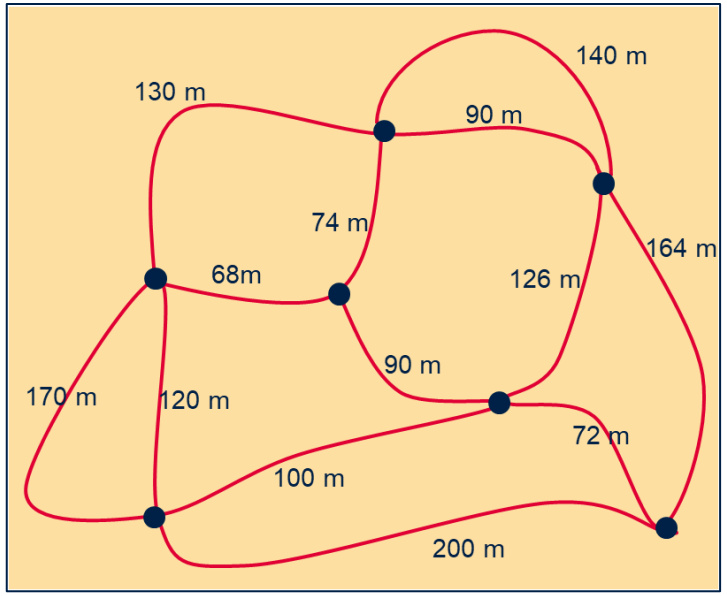


Complex numbers are based on the 'imaginary' number $\sqrt{-1}$. They lead to the study of lots of new areas of mathematics, including fractals like those shown in the image above.

What is Discrete/Decision Maths?

Many of the problems in Discrete maths involve Optimisation – finding an efficient solution – and hence methods are applicable to many real world situations.

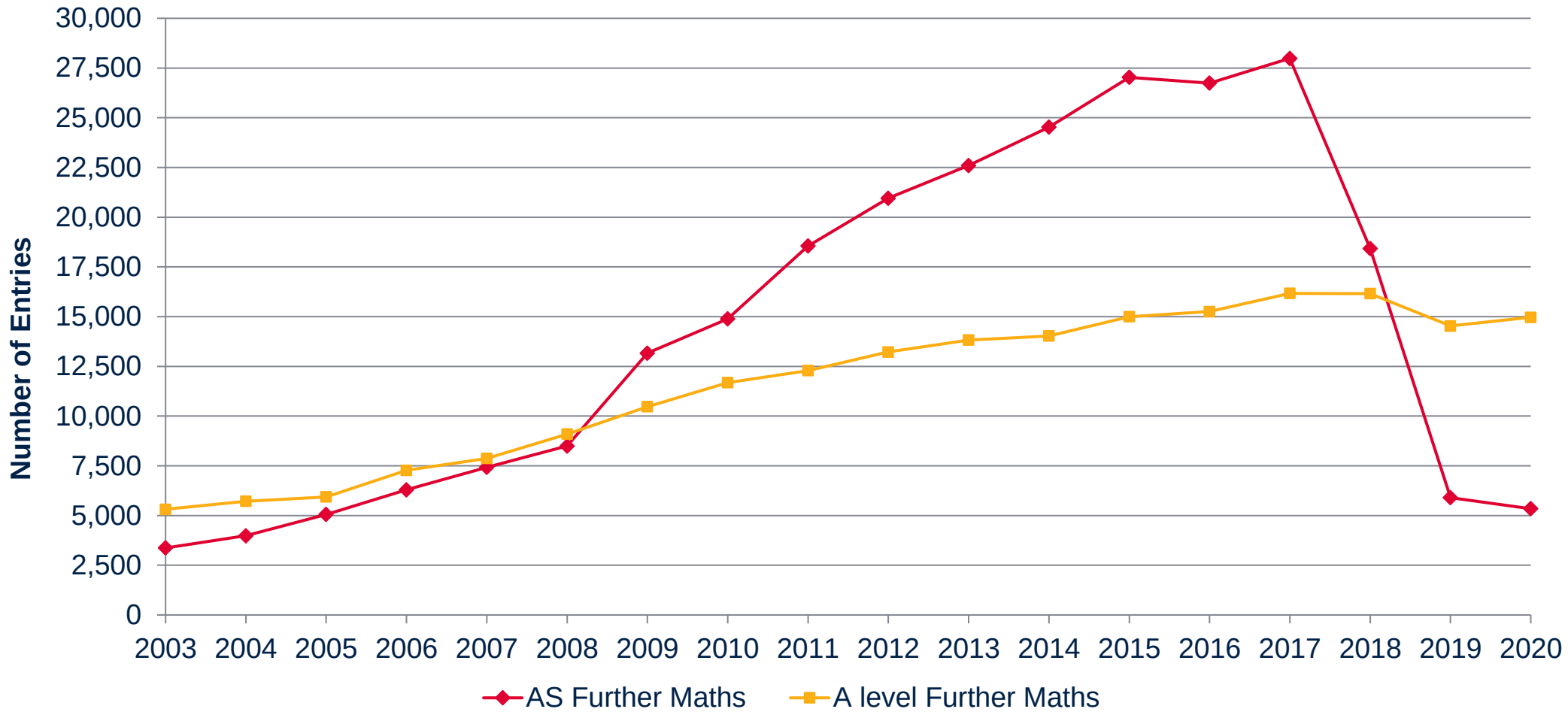
What would be the most efficient route for delivering post around this network of streets?



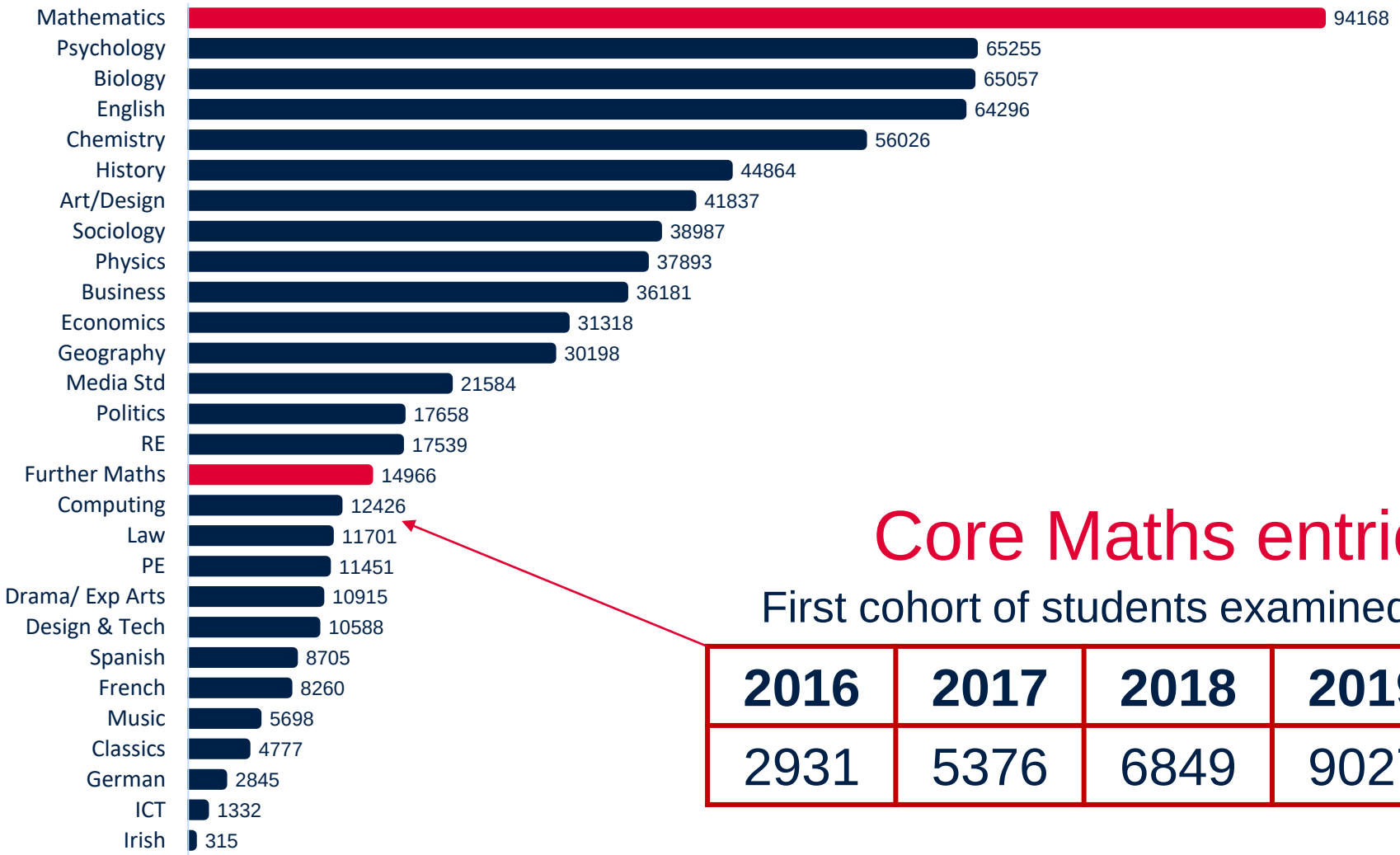
A Level Further Maths course requirements:

- A minimum of a grade 4 in GCSE English (Language) or GCSE English (Literature), AND
- A minimum total GCSE points score of 39 for the best eight individual GCSE subjects, AND
- A minimum of a grade 7 in GCSE Mathematics AND
- To be studying A Level Mathematics

A and AS level Further Mathematics entries in the UK 2003-2020 (JCQ data)



2020 UK A level entries by subject (JCQ data)



Core Maths entries

First cohort of students examined in 2016

2016	2017	2018	2019	2020
2931	5376	6849	9027	11792

A level Further Maths and degrees

Degree subject category	% of accepted students with A levels who have studied A level Further Maths (entry 2016)
Mathematics (G1)	65%
Physics (F3)	38%
General Engineering (H1)	28%
Mechanical Engineering (H3)	26%
Chemical, Process and Energy Engineering (H8)	17%
Computer Science (I1)	16%
Economics (L1)	11%
Chemistry (F1)	8%

Exemplar Entry Requirements

AAA / A*AB **alternatively**

AAB / A*BB, including Further Mathematics **or**

AAB / A*BB, PLUS Grade A in AS level Further Mathematics

In all cases, the first grade quoted is the Mathematics A level.

Leeds University 2021 entry

A*A*A - Mathematics, Further Mathematics and one other subject.
Also, Grade 1 in STEP II and III.

Cambridge University 2021 entry

CCE including Mathematics (typical offer)

London Metropolitan University 2020 entry

Exemplar Entry Requirements

ABB-BBB to include Maths.

Swansea University (Chemical Engineering degree), 2021 entry

AAB including Mathematics and either Physics, Electronics, Further Mathematics or Chemistry.

Manchester University (Electrical & Electronic Engineering degree), 2021 entry

BCC including Mathematics and one other Science at grade C or above.

Northampton University (Mechanical Engineering degree), 2020 entry

Exemplar Entry Requirements

AAB - ABB to include Chemistry and one further science subject (from Biology, Human Biology, Physics, Maths, Further Maths, Psychology, Geography or Geology).

Southampton University (Chemistry degree), 2021 entry

ABB-BBB including grade B in Maths.

Reading University (Meteorology and Climate degree), 2021 entry

Exemplar Entry Requirements

ABB. One science A level required, two science A levels preferred and may lead to a lower offer. (List of sciences includes Mathematics and Further Mathematics)

Liverpool University (Psychology degree), 2021 entry

A*AA. Applicants must have achieved an A in A level Maths

University of Warwick (Economics degree), 2021 entry

University entry requirements

Look at the entry requirements on an individual university's website for the degree subjects that you might be interested in

In some cases **a qualification in Core Maths or or A level Mathematics/Further Mathematics will reduce the grades required for entry** to a degree course in a related subject

Visit www.ucas.com for additional information

Exemplar University Alternative Offers

Typical offer A level	Alternative offer A level
A*AA	AAA
AAA or A*AB	AAB
AAB	ABB

- Applies to degrees that **require** A level Maths
- For students achieving a **grade B** in **AS or A level Further Maths**

Courses: Civil, Chemical, Mechanical and Electrical Engineering, Computer Science, Physics, Economics and Accounting & Finance

The University of Sheffield

From September 2019, if we offer you a place on certain courses with an A Level Maths requirement and you're taking AS or A Level Further Maths, we'll make you an alternative offer equivalent to one A Level grade below the standard entry requirements, subject to you achieving a specific grade in Further Maths.

Taken from https://www.sheffield.ac.uk/undergraduate/apply/access#

The University of Sheffield

BSc Chemistry: AAB including Chemistry, or BBB, including Chemistry + B in a EPQ, or ABB, including A in Chemistry + A in Further Maths

BEng Aerospace Engineering:

AAB, including Maths and a science, or ABB, including Maths and a science + B in a relevant EPQ, or ABB, including Maths and a science + A in AS or B in A Level Further Maths

My daughter/son loves maths. How can they be stretched?

Take Further Mathematics at AS or A level.

Tackle problems on the NRICH website.

Study for additional qualifications in mathematics such as STEP, TMUA or the MAT, which are required for entrance to some leading universities to study mathematics.

Other sources of information

AMSP website www.amsp.org.uk

Maths Careers website www.mathscareers.org.uk

Apprenticeship websites e.g. www.amazingapprenticeships.com

Universities and Colleges Admissions Service (UCAS) www.ucas.com

Russell Group Universities www.informedchoices.ac.uk

Tomorrow's Engineers www.tomorrowsengineers.org.uk

The Institute of Physics (IOP) www.iop.org

Nrich www.nrich.org.uk