

A-LEVEL FURTHER MATHEMATICS

A good A Level Further Mathematics student is curious, resilient, and able to think logically and independently when solving unfamiliar problems. Unlike A Level Maths, which builds a solid foundation in topics such as algebra, calculus, statistics, and mechanics, Further Maths goes much deeper into advanced and abstract ideas like matrices, complex numbers, and proof. This means successful students must move beyond memorising methods and instead aim for full understanding. They also need strong algebra skills, good organisation, and consistent practice to manage the increased difficulty and workload effectively.

Summary of course content

The Mathematics A-Level Further Maths syllabus is split into three areas:

Pure Maths	Mechanics	Discrete
<u>Papers 1 & 2</u> - A: Proof - B: Complex numbers - C: Matrices - D: Further algebra and functions - E: Further calculus - F: Further vectors - G: Polar coordinates - H: Hyperbolic functions - I: Differential equations - J: Numerical methods	<u>Paper 3 – Booklet 1</u> - MA: Dimensional analysis - MB: Momentum & collisions - MC: Work, energy & power - MD: Circular motion - ME: Centre of mass & moments	<u>Paper 3 – Booklet 2</u> - DA: Graphs - DB: Networks - DC: Network flows - DD: Linear programming - DE: Critical path analysis - DF: Game theory for zero-sum games - DG: Binary operations

- Each exam paper is $33\frac{1}{3}\%$ of the course, 2hrs long and worth 100 marks.
- Each paper includes a mix of question styles, from short, single-mark questions to multi-step problems.

What you should be doing as an independent learner in your four hours of independent study per week?

Weekly:	Independent practice: You will be guided by your teacher on which exercises should be completed from the textbook. You are recommended to complete every question – both in the <u>fluency exercise</u> and the <u>reasoning exercise</u>. All independent practice should be attached to Teams (photo/pdf) so your teacher can check your understanding.
Fortnightly:	Challenge questions: In the textbook, these problems will stretch you with questions at the highest level of demand. Independent Study Folder (ISF): this will be checked fortnightly by your tutor and logged.
Half termly:	Revision: As well as completing all questions from the textbook, redo knowledge quizzes and end of unit assessments for each topic. Review recent lessons, learn key processes and produce revision resources, e.g., flashcards, mind maps, posters, etc. Complete past exam papers (here).

Resources

In addition to those provided for specific tasks by your teacher, resources include:

- AQA A level Further Maths student textbook (Hodder Education)
- Casio FX-991 EX CLASSWIZ calculator
- www.examsolutions.net: to access videos to support current learning
- www.physicsandmathstutor.com: to access past exam papers

- www.plus.maths.org: to access further reading

Independent learning overview

Two hours directed by each of your teachers (subject to change):

For each textbook exercise, please **complete all questions from both sections** A (fluency) and B (reasoning)

Y12	Teacher 1	Teacher 2
07.09.26	Enrolment week	Enrolment week
14.09.26	Complex numbers: Properties & Arithmetic Ex1.1	Algebra & series: Roots of polynomials Ex2.1
21.09.26	Complex numbers: Solving polynomial equations Ex1.2	Algebra & series: Inequalities Ex2.2
28.09.26	Complex numbers: Argand diagrams Ex1.3	
05.10.26	Complex numbers: Modulus-argument form of loci Ex1.4	Algebra & series: Summing series and the method of differences Ex2.3
12.10.26	Curve sketching: Linear rational functions Ex3.1	
19.10.26	Curve sketching: Quadratic rational functions Ex3.2	Algebra & series: Proof by induction Ex2.4
26.10.26	Half term	
02.11.26	Curve sketching: Polar coordinates Ex3.3	Algebra & series: Maclaurin series 1 Ex2.5
09.11.26	Curve sketching: Parabolas, ellipses and hyperbolas Ex3.4	Matrices 1: Properties & arithmetic Ex5.1
16.11.26	Curve sketching: Hyperbolic functions Ex3.5	Matrices 1: Transformations Ex5.2
23.11.26	Integration 1: Mean Values Ex4.1	Matrices 1: Systems of linear equations Ex5.3
30.11.26	Integration 1: Volumes of revolution Ex4.2	Graphs & networks: Graphs & networks Ex12.1
07.12.26	Vectors 1: The vector equation of a line Ex6.1	Graphs & networks: Traversing a graph Ex12.2
14.12.26	Vectors 1: The scalar product Ex6.2	Graphs & networks: Minimum spanning trees & Kruskal's algorithm Ex12.3
21.12.26	Christmas holidays	
28.12.26	Christmas holidays	
04.01.27	Vectors 1: finding distances 1 Ex6.3	Graphs & networks: Minimum spanning trees & Prim's algorithm Ex12.4
11.01.27	Forces & energy: Work, energy & power Ex7.1	Graphs & networks: The route inspection problem Ex12.5
18.01.27	Forces & energy: Hooke's law Ex7.2	Graphs & networks: The travelling salesman problem Ex12.6
25.01.27	Forces & energy: Dimensional analysis Ex7.3	Graphs & networks: Network flows 1 Ex12.7
01.02.27	Work experience	
08.02.27	Momentum: Conservation of momentum Ex8.1	Critical path analysis: Activity networks Ex 13.1
15.02.27	Half term	
22.02.27		Critical path analysis: Critical paths Ex 13.2
01.03.27	Momentum: Collisions Ex8.2	Linear programming & game theory 1: Constrained optimisation Ex14.1
08.03.27		Linear programming & game theory 1: Zero-sum games Ex14.2
15.03.27	Momentum: Impulses Ex8.3	Linear programming & game theory 1: Mixed strategy games Ex14.3
22.03.27	Circular motion 1: Kinematics of circular motion Ex9.1	Abstract algebra: Binary operations Ex15.1
29.03.27	Easter holidays	
05.04.27	Easter holidays	
12.04.27	Circular motion 1: Horizontal circular motion Ex9.2	Abstract algebra: Modular arithmetic Ex15.2
19.04.27		
26.04.27		

03.05.27		
10.05.27		
17.05.27		
24.05.27		
31.05.27	Half term	
07.06.27	Matrices 2: Determinants, inverse matrices & linear programming Ex22.1	Complex Numbers 2: Exponential form Ex16.1
14.06.27		
21.06.27		Complex Numbers 2: De Moivre's Theorem Ex16.2
28.06.27	Matrices 2: Manipulating determinants Ex22.2	
05.07.27		Complex Numbers 2: Roots of unity Ex16.3
12.07.27	Matrices 2: Eigenvalues & eigenvectors Ex22.3	
19.07.27		

Y13	Teacher 1	Teacher 2
07.09.26	Enrolment week	Enrolment week
14.09.26	Curve sketching 2: Transformations Ex18.2	Series: Summing series using partial fractions Ex17.1
21.09.26	Curve sketching 2: Hyperbolic functions 2 Ex18.3	
28.09.26	Integration 2: Improper Integrals Ex19.1	
05.10.26	Integration 2: Inverse Trigonometric functions Ex19.2	Series: Maclaurin Series Ex17.2
12.10.26	Integration 2: Hyperbolic functions Ex19.3	
19.10.26	Integration 2: Partial fractions Ex19.4	
26.10.26	Half term	
02.11.26	Integration 2: Reduction formulae Ex19.5	Curve sketching 2: Reciprocal and modulus graphs 2 Ex18.1
09.11.26	Integration 2: Polar graphs and areas Ex19.6	
16.11.26	Integration 2: Lengths and surface area Ex19.7	Curve sketching 2: Rational functions with oblique asymptotes Ex18.4
23.11.26	Differential equations: First order equations Ex20.1	
30.11.26	Differential equations: Second order equations Ex20.2	Graphs & networks 2: Planar graphs and isomorphisms Ex28.1
07.12.26	Differential equations: Simple harmonic motion Ex20.3	
14.12.26	Differential equations: Damped and forced harmonic motion Ex20.4	
21.12.26	Christmas holidays	
28.12.26	Christmas holidays	
04.01.27	Differential equations: Coupled equations Ex20.5	Graphs & networks 2: Network flows 2 Ex28.2
11.01.27	Numerical Methods: Numerical integration Ex21.1	
18.01.27	Numerical Methods: Euler's method Ex21.2	
25.01.27	Vectors 2: The vector product Ex 23.1	Critical paths analysis 2: Gantt charts Ex29.1
01.02.27	Vectors 2: the equation of a plane Ex 23.2	
08.02.27	Vectors 2: finding distances 2 Ex 23.3	Critical paths analysis 2: Resourcing Ex29.2
15.02.27	Half term	
22.02.27	Circular motion 2: Kinematics of circular motion 2 Ex24.1	Linear programming and game theory 2: Simplex algorithm Ex30.1
01.03.27	Circular motion 2: The conical pendulum Ex24.2	Linear programming and game theory 2: Games as linear programming problems Ex30.2
08.03.27	Circular motion 2: Vertical circular motion Ex24.3	
15.03.27	Centres of mass & stability: Moments & couples Ex 25.1	Group Theory: Groups Ex31.1
22.03.27	Centres of mass & stability: Centre of mass for point masses and laminas Ex 25.2	Group Theory: Subgroups Ex31.2
29.03.27	Easter holidays	
05.04.27	Easter holidays	
12.04.27	Centres of mass & stability: Centre of mass for laminas and solids Ex 25.3	Group Theory: Isomorphisms Ex31.3
19.04.27	Centres of mass & stability: Further topics with centres of mass Ex 25.4	
26.04.27	Centres of mass & stability: Equilibrium Ex 25.5	
03.05.27		
10.05.27		
17.05.27		
24.05.27		
31.05.27	Half term	
07.06.27		

14.06.27		
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19.07.27		