



Mathematics & Further Mathematics

Exam Board: Edexcel

Advanced Subsidiary GCE in Mathematics (AS Level Mathematics)

Advanced Subsidiary GCE in Mathematics
(AS Level Mathematics)

Preferred entry requirements:
Grade 6 or above at GCSE Mathematics

Content and assessment overview

The AS Mathematics consists of two externally-examined papers. Students must complete all assessment in May/June in any single year.

Paper 1: Pure Mathematics

Written examination: 2 hours

66.66% of the qualification. 100 marks.

Content overview

- Topic 1 – Proof
- Topic 2 – Algebra and functions
- Topic 3 – Coordinate geometry in the (x,y) plane
- Topic 4 – Sequences and series
- Topic 5 – Trigonometry
- Topic 6 – Exponentials and logarithms
- Topic 7 – Differentiation
- Topic 8 – Integration
- Topic 9 – Vectors

Assessment overview

Students must answer all questions.
Calculators can be used in the assessment.

Paper 2: Statistics and Mechanics

Written examination: 1 hour

33.33% of the qualification. 50 marks.

Content overview

- Section A: Statistics
 - Topic 1 – Statistical sampling
 - Topic 2 – Data presentation and interpretation
 - Topic 3 – Probability
 - Topic 4 – Statistical distributions
 - Topic 5 – Statistical hypothesis testing

Section B: Mechanics

- Topic 6 – Quantities and units in mechanics
- Topic 7 – Kinematics
- Topic 8 – Forces and Newton's laws

Assessment overview

The assessment comprises two sections: Section A – Statistics and Section B – Mechanics. Students must answer all questions. Calculators can be used in the assessment.

Advanced GCE in Mathematics (A Level Mathematics)

Preferred entry requirements: Grade 6 or above at GCSE Mathematics

Content and assessment overview

The Advanced GCE in Mathematics consists of three

externally examined papers. Students must complete all assessment in May/June in any single year.

Paper 1: Pure Mathematics 1

Written examination: 2 hours

33.33% of the qualification. 100 marks.

Content overview

- Topic 1 – Proof
- Topic 2 – Algebra and functions
- Topic 3 – Coordinate geometry in the (x,y) plane
- Topic 4 – Sequences and series
- Topic 5 – Trigonometry
- Topic 6 – Exponentials and logarithms
- Topic 7 – Differentiation
- Topic 8 – Integration
- Topic 9 – Vectors

Assessment overview

Students must answer all questions.
Calculators can be used in the assessment.

Paper 2: Pure Mathematics 2

Written examination: 2 hours

33.33% of the qualification. 100 marks.

Content overview

- Topic 1 – Proof
- Topic 2 – Algebra and functions
- Topic 3 – Coordinate geometry in the (x,y) plane
- Topic 4 – Sequences and series
- Topic 5 – Trigonometry
- Topic 6 – Differentiation
- Topic 7 – Integration
- Topic 8 – Numerical methods

Assessment overview

All the content of the specification for Paper 1 is assumed knowledge for Paper 2 and may also be tested within parts of questions.
Students must answer all questions.
Calculators can be used in the assessment.

Paper 3: Statistics and Mechanics

Written examination: 2 hours

33.33% of the qualification. 100 marks.

Content overview

Section A: Statistics

- Topic 1 – Statistical sampling
- Topic 2 – Data presentation and interpretation
- Topic 3 – Probability
- Topic 4 – Statistical distributions
- Topic 5 – Statistical hypothesis testing

Section B: Mechanics

- Topic 6 – Quantities and units in mechanics
- Topic 7 – Kinematics
- Topic 8 – Forces and Newton's laws
- Topic 9 – Moments

Assessment overview

The assessment comprises two sections: Section A – Statistics and Section B – Mechanics.
Students must answer all questions.
Calculators can be used in the assessment.

Advanced Subsidiary GCE in Further Mathematics (AS Level Further Mathematics)

Entry requirements: Students must be studying or have studied A level mathematics

Content and assessment overview

The Advanced Subsidiary GCE in Further Mathematics consists of two externally-examined papers.
Students must complete all assessment in May/June in any single year.

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

Assessment overview

Students must answer all questions.
Calculators can be used in the assessment.

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

Assessment overview

Students must answer all questions.
Calculators can be used in the assessment.

Advanced GCE in Further Mathematics (A Level Further Mathematics)

Entry requirements: Students must be studying or have studied A level mathematics

Content and assessment overview

The Advanced GCE in Further Mathematics consists of four externally examined papers. Students must complete all assessment in May/June in any single year.

Paper 1: Further Pure Mathematics 1

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

Assessment overview

Students must answer all questions.
Calculators can be used in the assessment.

Paper 2: Further Pure Mathematics 2

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

Assessment overview

Students must answer all questions.
Calculators can be used in the assessment.

Paper 3: Further Mathematics Option 1

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.

Assessment overview

Students must answer all questions.
Calculators can be used in the assessment.

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.

Assessment overview

Students must answer all questions.

Calculators can be used in the assessment.

The aims and objectives of the Mathematics department are to enable students to:

Understand coherence and progression in mathematics and how different areas of mathematics are connected.

Apply mathematics in other fields of study and be aware of the relevance of mathematics to the world of work and to situations in society in general.

Use their mathematical knowledge to make logical and reasoned decisions in solving problems both within pure mathematics and in a variety of contexts, and communicate the mathematical rationale for these decisions clearly.

Reason logically and recognise incorrect reasoning.

Generalise mathematically.

Construct mathematical proofs.

Use their mathematical skills and techniques to solve challenging problems which require them to decide on the solution strategy.

Recognise when mathematics can be used to analyse and solve a problem in context.

Represent situations mathematically and understand the relationship between problems in context and mathematical models that may be applied to solve them.

Draw diagrams and sketch graphs to help explore mathematical situations and interpret solutions.

Make deductions and inferences and draw conclusions by using mathematical reasoning.

Interpret solutions and communicate their interpretation effectively in the context of the problem.

Read and comprehend mathematical arguments, including justifications of methods and formulae, and communicate their understanding.

Read and comprehend articles concerning applications of mathematics and communicate their understanding.

Use technology such as calculators and computers effectively, and recognise when such use may be inappropriate.

Take increasing responsibility for their own learning and the evaluation of their mathematical development.