

Paper 2: Further Mathematics Options (*Paper codes: 8FM0/2A-2K)

Written examination: 1 hour and 40 minutes

50% of the qualification

80 marks

Content overview

Students take **one** of the following ten options:

2A: Further Pure Mathematics 1 and Further Pure Mathematics 2

2B: Further Pure Mathematics 1 and Further Statistics 1

2C: Further Pure Mathematics 1 and Further Mechanics 1

2D: Further Pure Mathematics 1 and Decision Mathematics 1

2E: Further Statistics 1 and Further Mechanics 1

2F: Further Statistics 1 and Decision Mathematics 1

2G: Further Statistics 1 and Further Statistics 2

2H: Further Mechanics 1 and Decision Mathematics 1

2J: Further Mechanics 1 and Further Mechanics 2

2K: Decision Mathematics 1 and Decision Mathematics 2

Assessment overview

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

*See *Appendix 8: Codes* for a description of this code and all other codes relevant to this qualification.

2 Subject content and assessment information

Qualification aims and objectives

The aims and objectives of this qualification are to enable students to:

- understand mathematics and mathematical processes in ways that promote confidence, foster enjoyment and provide a strong foundation for progress to further study
- extend their range of mathematical skills and techniques
- 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 own mathematical development.

Overarching themes

The overarching themes should be applied along with associated mathematical thinking and understanding, across the whole of the detailed content in this specification.

These overarching themes are inherent throughout the content and students are required to develop skills in working scientifically over the course of this qualification. The skills show teachers which skills need to be included as part of the learning and assessment of the students.

Overarching theme 1: Mathematical argument, language and proof

A Level Mathematics students must use the mathematical notation set out in the booklet *Mathematical Formulae and Statistical Tables* and be able to recall the mathematical formulae and identities set out in *Appendix 1*.

	Knowledge/Skill
OT1.1	Construct and present mathematical arguments through appropriate use of diagrams; sketching graphs; logical deduction; precise statements involving correct use of symbols and connecting language, including: constant, coefficient, expression, equation, function, identity, index, term, variable
OT1.2	Understand and use mathematical language and syntax as set out in the glossary
OT1.3	Understand and use language and symbols associated with set theory, as set out in the glossary
OT1.5	Comprehend and critique mathematical arguments, proofs and justifications of methods and formulae, including those relating to applications of mathematics

Overarching theme 2: Mathematical problem solving

	Knowledge/Skill
OT2.1	Recognise the underlying mathematical structure in a situation and simplify and abstract appropriately to enable problems to be solved
OT2.2	Construct extended arguments to solve problems presented in an unstructured form, including problems in context
OT2.3	Interpret and communicate solutions in the context of the original problem
OT2.6	Understand the concept of a mathematical problem solving cycle, including specifying the problem, collecting information, processing and representing information and interpreting results, which may identify the need to repeat the cycle
OT2.7	Understand, interpret and extract information from diagrams and construct mathematical diagrams to solve problems

Overarching theme 3: Mathematical modelling

	Knowledge/Skill
OT3.1	Translate a situation in context into a mathematical model, making simplifying assumptions
OT3.2	Use a mathematical model with suitable inputs to engage with and explore situations (for a given model or a model constructed or selected by the student)
OT3.3	Interpret the outputs of a mathematical model in the context of the original situation (for a given model or a model constructed or selected by the student)
OT3.4	Understand that a mathematical model can be refined by considering its outputs and simplifying assumptions; evaluate whether the model is appropriate]
OT3.5	Understand and use modelling assumptions