

The current content of AS and A2 Further Mathematics

AS Further Mathematics

- This consists of 3 modules.
- Further Pure 1 is compulsory.
- Students take 2 other modules, which are typically 2 additional application modules. (either Mechanics 1, Mechanics 2, Statistics 1, Statistics 2, Decision 1, Decision 2)
- Alternatively they could take Further Pure 2 or Further Pure 3 as one or both of these options.

Typical Content of Further Pure 1 (FP1) modules

Introduction to Complex Numbers

Definitions, basic arithmetic
Argand diagrams
Polynomial equations with complex roots

Sum of Power Series

Numerical methods for solving equations
Graphs of Rational Functions

Introduction to Matrices

Definitions, basic arithmetic
Matrices as transformations
Determinant and inverse of 2×2

Proof by Induction

Coordinate Systems
Roots of Polynomials

A2 Further Mathematics

- This consists of an additional 3 modules (on top of the 3 for AS Further Mathematics).
- Students take one additional Further Pure module, which is compulsory, either FP2 or FP3.
- Students then choose 2 other modules, which are typically 2 more application modules.
- Alternatively they may take other Further Pure modules instead of an application.

Content of Further Pure 2 and Further Pure 3 varies across the different specifications. Depending on which board students follow and which module(s) they take they will meet some of the following topics.

Typical Content of Further Pure 2 and 3 modules

Further Complex Numbers

Polar form
De Moivre's theorem
Transformations
Exponential notation
 n th roots of complex numbers
Proving hyperbolic trigonometric identities

Coordinate Systems

Polar Coordinates
Intrinsic coordinates
Conic sections
Maclaurin & Taylor series and approximations

Hyperbolic Functions

Definitions, properties and identities
Use in calculus

Groups

Definition and properties
Lagrange's theorem

Further Matrices

Determinant, inverse of 3×3 matrices
Use in solving linear simultaneous equations,
Equations of planes and geometric interpretation
Characteristic polynomial
Eigenvalues and eigenvectors

Calculus

Using inverse trigonometric functions,
Hyperbolic trigonometric functions
More advanced substitution

Differential Equations

1st and 2nd order linear ODEs
Using an integrating factor

Vectors

Vector product, triple scalar product

Numerical Methods

Iterative methods
Newton-Raphson method

Further details can be found in the document Pre-University Mathematics Guide

http://www.mei.org.uk/files/pdf/Pre_Uni_Maths_Guide.pdf