



Mathematics A Level Exam Information

Summer 2022

A-level Mathematics – 3 Papers

Paper 9MA0/01 Pure Mathematics 1 – (2 hours, Tues 7th June, 13:45)

- Formal proof
- The factor theorem
- Understand and use graphs of functions
- Use intersection points of graphs to solve equations
- Transformations of a curve
- Use of functions in modelling
- The coordinate geometry of the circle
- Arithmetic sequences and series
- Differentiation: stationary points, minima. Radian measure
- Trigonometric identities and equations
- Trigonometric functions and identities: area under a curve
- Exponentials: Solving equations, rate of change
- Maximum point; iteration
- Integration as a limit
- Methods of integration
- Use vectors to solve a problem in pure mathematics

Paper 9MA0/02 Pure Mathematics 2 – (2 hours, Tues 14th June, 13:45)

- Formal proof
- The modulus of a linear function
- Understand and use function notation

- The binomial expansion
- Sequence generated by an iterative formula
- Geometric sequences and series; trigonometric identities
- Use of a trigonometric function
- The function a^x and its graph
- Differentiation; roots of equations
- Differentiation from first principles
- Find maximum and minimum points; Newton- Raphson method
- Differentiation of curves defined parametrically
- Area under a curve
- Solution of a first order differential equation; partial fractions
- The trapezium rule
- Use vectors to solve problems in pure mathematics

Paper 9MA0/3 Statistics & Mechanics – (2 hours, Tues 21st June, 13:45)

- Regression lines (change of variable); hypothesis test for correlation
- Measures of central tendency and variation
- Probability and Venn diagrams
- Discrete probability distributions; normal approximation
- Normal distribution
- Hypothesis testing
- Constant acceleration in 2-D and Newton's 2nd law in 2-D using vectors
- Variable acceleration, language of kinematics
- Projectiles, constant acceleration
- Dynamics, resolving forces, friction, equilibrium
- Statics, moments, resolving forces, friction

A-level Further Mathematics – 4 Papers

Paper 9FM0/01 Further Mathematics Core Pure 1 – (1hr 30mins, Weds 25th May, 13:45)

- Complex numbers: Multiplication and division, conjugates
- Complex numbers: Roots of polynomial equations, Argand diagram

- De Moivre's theorem; Volumes of revolution
- Matrices: Inverse of a 3×3 matrix, singular and non-singular
- Method of differences for summation of finite series
- Improper integrals; Hyperbolic functions
- Integration; Partial fractions
- Inverse hyperbolic functions
- Solution of first order differential equations
- Solution of second order non-homogenous differential equations

Paper 9FM0/02 Further Mathematics Core Pure 2 – (1hr 30mins, Weds 8th June, 13:45)

- Proof by induction; Use matrices to represent linear transformations in 2-D
- Complex numbers: Multiplication and division
- Complex numbers; Addition and subtraction; simple loci in the Argand diagram
- Matrices: Solution of three simultaneous equations
- The relationship between roots and coefficients of polynomial equations
- Differentiate inverse trigonometric functions
- Vectors; Equation of a straight line, scalar product, perpendicular distance from a point to a plane
- Polar coordinates: Area enclosed by a curve, tangents
- Differentiation of hyperbolic functions; Maclaurin series

Paper 9FM0/3B Further Statistics 1 – (1hr 30mins, Fri 17th June, 13:45)

- Discrete probability distributions (mean and variance)
- Geometric and negative binomial distributions
- Hypothesis tests; Poisson approximation
- Central Limit Theorem
- Chi squared test (goodness of fit, binomial)
- Probability generating functions
- Type I and Type II errors

Paper 9FM0/3D Decision Mathematics 1 – (1hr 30mins, Thurs 23rd June, 13:45)

- Bin packing

- Sorts; Flow charts
- Dijkstra's algorithm; Shortest inspection route around a network.
- Floyd's algorithm; Nearest neighbour algorithm
- Critical Path Analysis including Gantt charts and resource histograms
- Formulating and using Simplex to solve a linear programme
- Big-M method

L3 Core Mathematics – 2 Papers

Paper 1350/1 Core Mathematics Paper 1 – (1hr 30mins, Weds 8th June, 13:45)

- Types of data, collecting, sampling and representing data (numerically and diagrammatically)
- Percentage change
- Interest rates
- Repayments and the cost of credit
- Graphical representation
- Taxation
- RPI
- Estimation techniques

Paper 1350/2A Core Mathematics Paper 2A – (1hr 30mins, Tues 14th June, 13:45)

- Critical analysis of data
- Normal distribution