

Key Stage 5 Curriculum Overview for A Level Maths - 2021 to 2022

Pure Maths

Year	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
12	<p>Powers: Power rules, fractional and negative powers and surds.</p> <p>Quadratic Equations: equations that can be written in the form $ax^2+bx+c=0$</p> <p>Inequalities: Introduce the modulus function and graphical and algebraical comparisons of expressions.</p> <p>Graphs and Transformations: How changing an equation changes the shape, orientation and/or position of a graph.</p>	<p>Straight Line Graphs: See how the equations of lines at right angles and parallel lines relate to each other.</p> <p>Circles: The equation of a circle and how to use the graphs of circles to solve geometric problems.</p> <p>Functions and Algebraic Methods: Methods of manipulating or deriving them functions (e.g. algebraic long division and the factor theorem)</p>	<p>Binomial Expansion: A way of expanding brackets in the form $(a+b)^n$ without having to multiply them out.</p> <p>Trigonometry: sin, cos and tan as features of a circle and solving equations with sin, cos and tan to all the solutions.</p>	<p>Vectors: How to manipulate quantities that have both size and direction and use these to solve geometric problems.</p> <p>Differentiation: How to find the gradients of curves.</p>	<p>Integration: How to find the area under curves.</p> <p>Exponentials and Logs: Methods for manipulating with equations with powers.</p>	<p>Y13 Partial Fractions: splitting up algebraic fractions</p>
13	<p>Algebraic Methods: Methods of proof and algebraic fractions</p> <p>Functions and Graphs: Functions within functions and how multiple changes to an equation changes the shape, orientation and/or position of a graph.</p> <p>Sequences and Series: arithmetic (add a constant each time) and geometric (times by a constant each time) series.</p> <p>Binomial Expansion: $(a+b)^n$ when n is not a whole number</p>	<p>Radians and Trigonometry: A better measure of angle than degrees. More trigonometric formulae and their use.</p>	<p>Parametric Equations: Equations where x and y a given in terms of a third variable</p> <p>Differentiation: Further methods to find gradients e.g. equations with embedded functions, parameters, products or divisions.</p>	<p>Integration: Further methods to find the area under curves e.g. by substitution or splitting the expression into partial fractions.</p>	<p>Numerical Methods: Finding approximate solutions to equations that can't be solved by standard methods.</p> <p>Vectors: Vectors in 3 dimensions.</p>	External Exams

Applied Maths

Year	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
12	<p>Measures of Location and Spread: averages and standard deviation.</p> <p>Representation of Data: constructing and interpreting statistical diagrams (e.g. box plots and histograms)</p>	<p>Correlation: Scatter graphs and regression (the way to calculate the line of best fit)</p> <p>Probability: Calculating probability by use of diagrams (eg tree and Venn diagrams) to</p> <p>Data Collection: The different methods of sampling data.</p>	<p>Statistical Distributions: calculating probability using a model (e.g. binomial)</p> <p>Hypothesis Testing: as close as you can come to a proof in statistics.</p> <p>Modelling in Mechanics: Simplifying assumptions and how they affect the accuracy of a model.</p>	<p>Constant Acceleration Formulae: calculating acceleration velocity and displacement.</p> <p>Forces and Motion: Using Newton's second law ($F=ma$)</p>	<p>Variable Acceleration: Using differentiation and integration to find acceleration velocity and displacement.</p>	<p>Y13 Conditional Probability</p>
13	<p>Bivariate Data: Using logs to transform curves to straight lines.</p> <p>Hypothesis testing with correlation.</p> <p>Conditional Probability: probability depends on what has happened.</p>	<p>Normal Distribution: Very common distribution with continuous (measurement data)</p> <p>Moments: the turning effect of forces</p>	<p>Forces and Friction: Relating friction to the reaction force</p> <p>Projectiles: Motion where the only force acting is gravity.</p>	<p>Application of Forces: Combining moments and friction</p>	<p>Kinematics: Variable acceleration in vector form.</p>	<p>External Exams</p>

Further Maths

(The exact order of the content in each half term may vary depending on the split of lessons between staff)

Year	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
12	<p>Calculus: A brief run through of most of the differentiation and integration from A level maths and some of the trigonometry.</p>	<p>Kinematics: motion with constant and variable acceleration. Matrices: Arrays of numbers that can be used to represent transformations in 2D and 3D Discrete Random Variables: The algebra of probability, expectation (population mean) and variance Complex Numbers: Combining imaginary numbers (multiples of the square root of minus one) with real numbers (normal numbers). Forces: Using Newton's second law ($F=ma$) Roots: Using the coefficients of a cubic and quartic equations to give information about the possible solutions.</p>	<p>Bivariate Data: Interpreting and hypothesis testing correlation and ranked correlation and regression. Sequences and Induction: Sigma notation and proof by induction. Friction: Friction and the normal reaction, particles on slopes. Complex Number Geometry: Representing sets of complex numbers that fit a rule or condition geometrically. Moments: The turning effect of a force.</p>	<p>Centre of Mass: Finding the centre of mass of two and three dimensional shapes. Inverse Matrices: Using inverse matrices to solve simultaneous equations. Vectors and 3D Space: Multiplying vectors and intersection of planes. Work Energy and Power: Kinetic energy and gravitational potential energy. Discrete Distributions: using discrete probability distributions (Binomial, Poisson Uniform and geometric)</p>	<p>Chi Squared: A hypothesis test that looks how well data fits a distribution. Impulse: Change in momentum and collisions. Dimensional Analysis: Using the dimensions (length, time, mass) to analyse models and formulae.</p>	<p>Y13 Work Summations and Series: Further proof by induction and differencing to simplify summations Matrices: Matrices and the intersection of planes</p>
13	<p>Vectors: Lines and planes Further Calculus: Using inverse trigonometric functions and partial fractions to integrate.</p>	<p>Complex Numbers: Powers and Roots of complex numbers. The exponential form (e to the i theta). Projectiles and Motion under Variable Force:</p>	<p>Hyperbolic Functions: Functions based on the hyperbola $x^2-y^2=1$ Applications of Integration: Volumes, mean of a function and general integration</p>	<p>Vector Product: Multiplying vectors to get a vector solution. Centres of Mass 2: Centres of mass using volumes of revolution and plane regions.</p>	<p>Modelling Oscillations: Simple harmonic motion. Motion of a simple pendulum. Statistics Recap: Recap of year 1 statistics.</p>	<p>External Exams</p>

Year	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
	<p>Matrices: Matrices and the intersection of planes (if not covered in HT6)</p> <p>Polar Coordinates: Graphs expressed in terms of a radius and an angle not x and y.</p> <p>Maclaurin Series: Deriving series that can approximate to common functions.</p>	<p>Circular Motion</p> <p>First Order Differential Equations: Equations in terms of variables and a first differential (eg x, y and dy/dx)</p>	<p>Second Order Differential Equations: Equations with second differentials (d^2y/dx^2)</p>	<p>Hook's Law: Springs, Extension, work and energy.</p> <p>Oblique Impact: Collisions at an angle.</p>		