

# Mathematics Curriculum Outline 2024-2025

This outline provides a long-term overview of the knowledge and skills developed in this subject. More detailed short- and medium-term schemes of work, not published here, are available by contacting the Mathematics Department.

	Term 1	Term 2	Term 3	Term 4	Term 5		
Year 13	<b>Unit Title:</b> 1. Year 2 Pure 2. Year 2 Applied  <b>Knowledge / Skills:</b> 1a. Trigonometric Identities and Equations 1b. Differentiation  2a. Friction 2b. Correlation and Regression. 2c. Conditional Probability	<b>Unit Title:</b> 1. Year 2 Pure 2. Year 2 Applied  <b>Knowledge / Skills:</b> 1a. Numerical Methods 1b. Algebra (Modulus Function, Proof, Binomial Expansion)  2a. Moments 2b. The Normal Distribution	<b>Unit Title:</b> 1. Year 2 Pure 2. Year 2 Applied  <b>Knowledge / Skills:</b> 1a. Coordinate Geometry (functions defined implicitly and parametrically) 1b. Integration  2a. Parabolic Motion	<b>Unit Title:</b> 1. Year 2 Pure 2. Year 2 Applied  <b>Knowledge / Skills:</b> 1a. Differential Equations 1b. Vectors.  2a. Vectors in Mechanics	<b>Unit Title:</b> 1. Year 2 Pure 2. Year 2 Applied  <b>Knowledge / Skills:</b> Revision		
	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6	
Year 12	<b>Unit Title:</b> 1. AS Pure 2. AS Applied  <b>Knowledge / Skills:</b> 1a. Surds & Indices 1b. Quadratics 1c. Inequalities 1d. Graphs/Transformations  2a. Motion with Constant Acceleration	<b>Unit Title:</b> 1. AS Pure 2. AS Applied  <b>Knowledge / Skills:</b> 1a. Coordinate Geometry 1b. Algebra (Proof, binomial expansion, factor theorem) 1c. Vectors  2a. Sampling Methods 2b. Measures of Average and Spread 2c. Representation of Data 2d. Regression Lines.	<b>Unit Title:</b> 1. AS Pure 2. AS Applied  <b>Knowledge / Skills:</b> 1a. Differentiation 1b. Trigonometry  2a. Force and Motion 2b. Probability	<b>Unit Title:</b> 1. AS Pure 2. AS Applied  <b>Knowledge / Skills:</b> 1a. Integration 1b Exponentials and Logarithms.  2a. Discrete Probability Distributions 2b. Binomial Hypothesis Tests 2c. Motion with Variable Acceleration.	<b>Unit Title:</b> 1. Pure 2. Applied  <b>Knowledge / Skills:</b> 1a. Revision for UCAS exam. 1b. Start Year 2 Pure - Radian Measure.  2a. Revision for UCAS exam. 2b. Start Year 2 Applied - Forces at Angles	<b>Unit Title:</b> Year 2 Pure  <b>Knowledge / Skills:</b> 1a. Sequences and Series 1b. Algebra and Functions. (Partial fractions, composites, inverses).	

Term 1	Term 2	Term 3	Term 4	Term 5
<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Number</li> <li>2. Geometry and measures</li> <li>3. Ratio and proportion</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Set notation for linear inequalities. Upper and lower bounds. Surds, simplifying. Rationalising denominators.</li> <li>2. Any triangle trigonometry. Area rule, sine rule, cosine rule. Bearings.</li> <li>3. Algebraic treatment of proportion. Graphs. Problem solving with ratio. Capture-recapture.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Geometry and measures</li> <li>2. Algebra</li> <li>3. Algebra</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Vector notation, laws of addition, subtraction, graphical representation. Resultants. Properties of vector addition. Basic problem solving.</li> <li>2. Solving quadratic inequalities. Completing the square. Max/min. Simultaneous equations one linear one quadratic. Circles.</li> <li>3. Addition and subtraction of algebraic fractions.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Algebra (cont'd)</li> <li>2. Geometry and measures</li> <li>3. Algebra</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Solving equations involving algebraic fractions. Algebraic proof.</li> <li>2. Areas of sectors and segments. Arc length. Volume and surface area for standard 3D shapes.</li> <li>3. Graph shapes for basic functions. Trigonometric function graphs.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Algebra (cont'd)</li> <li>2. Revision</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Transformations of graphs using function notation. Exponential functions and graphs. Approximate solutions to equations numerically. Solving equations graphically using a line added to a known equation.</li> <li>2. Revision including past papers.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Revision</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Revision including past papers.</li> </ol>

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>Algebra</li> <li>Algebra</li> <li>Statistics</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>Linear inequalities, double inequalities. Number lines. Integer solutions. Representing areas of linear inequalities.</li> <li>Solution of quadratics by factorisation. Plotting quadratics and solving. Turning points.</li> <li>Sampling. Petersen capture-recapture. Back to back stem and leaf. Pie charts. Frequency polygons. Histograms.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>Statistics</li> <li>Number</li> <li>Geometry and measures</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>Line graphs, time series, trends. Scatter diagrams, correlation, causality.</li> <li>Fractional powers, estimating powers and roots, standard form calculations.</li> <li>Similar shapes, lengths, areas and volumes. Units of area. Congruency.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>Geometry and measures</li> <li>Geometry and measures</li> <li>Algebra</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>Circle theorems, proof.</li> <li>Exact values, Pythagoras' Theorem and trigonometry in 3D.</li> <li>Expanding binomials and simplifying.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>Algebra (cont'd)</li> <li>Probability</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>Factorising a not equal to 1. Simplifying algebraic fractions by factorisation. Multiplication and division of algebraic fractions. Solving quadratics by factorising and formula.</li> <li>Product rule for counting. Probability rules for ME and Independent events. Tree diagrams. Vann diagrams. Set notation. Conditional probability.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>Algebra</li> <li>Algebra</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>Changing the subject of a formula including more than one term with new subject. Function notation, composite functions, inverse functions. Term to term sequences, subscript notation. Square and cube number sequences, triangular numbers, simple geometric. Position to term quadratic sequence.</li> <li><math>y = mx + c</math> and interpretation of m and c in context.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>Algebra (cont'd)</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>Midpoint and length of line segment. Finding equations of lines - various situations. Perpendicular and parallel lines. Basic curved graphs, plotting and shape. Real life graphs. Gradient being rate of change. Motion graphs - distance, velocity. Tangents to find gradient. Chords for average. Trapezium rule using max 4 strips.</li> </ol>

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Number</li> <li>2. Number</li> <li>3. Algebra</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Powers and roots, index notation, prime decomposition, order of operations.</li> <li>2. Fraction and decimal arithmetic, recurring decimals.</li> <li>3. Linear equations including brackets, formulae, identities, expressions.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Number</li> <li>2. Ratio and Proportion</li> <li>3. Geometry and measures</li> <li>4. Geometry and measures</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Percentages full coverage.</li> <li>2. Expressing ratios, direct and inverse proportion.</li> <li>3. Imperial measures, compound measures.</li> <li>4. Area and volume, quadrilaterals, circles and parts of circles, prisms and cylinders, exact values, plans and elevations, nets.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Algebra</li> <li>2. Algebra</li> <li>3. Algebra</li> <li>4. Geometry and measures</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Expanding up to two brackets and simplifying.</li> <li>2. Factorising into up to two brackets including common factor. Difference of two squares.</li> <li>3. Constructing, substituting into, and rearranging formula. Nth term linear and basic quadrilateral.</li> <li>4. Polygon angle rules, properties of shapes, similar triangles, length scale factors.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Statistics</li> <li>2. Algebra</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Averages and weighted means. Stem and leaf diagrams. Frequency tables. Grouped data. Quartiles and range. Cumulative frequency diagrams and uses. Box and whisker plots. Comparing data.</li> <li>2. Solving simultaneous equations by elimination. Graphical solutions.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Geometry and measures</li> <li>2. Geometry and measures</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Right angled triangle trigonometry. Two circle theorems. Bearings.</li> <li>2. Shape transformations full GCSE coverage.</li> </ol>	<p><b>Unit Title:</b></p> <ol style="list-style-type: none"> <li>1. Geometry and measures</li> </ol> <p><b>Knowledge / Skills:</b></p> <ol style="list-style-type: none"> <li>1. Continuation of Term 5 work.</li> <li>2. Standard constructions with straight edge and compass. Loci. Scale drawing and maps.</li> </ol>

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
	<p><b>Unit Title:</b> 1. Number 2. Number 3. Number</p> <p><b>Knowledge/Skills:</b> 1. Zero and negative indices, index laws, converting to and from standard form, significant figure rounding.  2. Review of +, −, ×, ÷ fractions and mixed numbers, order of operations questions with fractions.  3. Converting between fractions decimals and percentages, expressing a quantity as a fraction or decimal of another, finding a percentage of an amount, percentage increases/decreases using decimal multipliers.</p>	<p><b>Unit Title:</b> 1. Geometry and measures 2. Ratio and proportion 3. Algebra</p> <p><b>Knowledge/Skills:</b> 1. Review angles in parallel lines, three figure bearings, regular and irregular polygons, interior and exterior angles.  2. Simplifying ratios, map ratios, division of an amount into a given ratio, using ratios to find unknown amounts, ratios as fractions.  3. Differences between expressions, formulae and equations, constructing these from worded situations. Substituting into formulae (including powers), introduction to function notation, multiplying algebraic expressions, expanding single brackets including with non-linear terms, generating sequences from a given rule, finding the <math>n^{\text{th}}</math> term of a linear sequence.</p>	<p><b>Unit Title:</b> 1. Geometry and measures 2. Geometry and measures</p> <p><b>Knowledge/Skills:</b> 1. Finding lengths from given areas of shapes, circle nomenclature, circumference and area of a circle, perimeter and area of simple sectors of circles, area of compound shapes, introduction to circle theorems (angle in semi-circle and cyclic quadrilaterals)  2. Pythagoras' Theorem – finding hypotenuse and other sides, Pythagorean triples.</p>	<p><b>Unit Title:</b> 1. Algebra 2. Geometry and measures</p> <p><b>Knowledge/Skills:</b> 1. Review solving equations of the form <math>ax + b = cx + d</math>, forming and solving equations with brackets, × and ÷ simple algebraic fractions, solving equations involving fractions, representing inequalities on a number line, solving linear inequalities.  2. Volume of prisms including cylinders, density, converting metric units of volume.</p>	<p><b>Unit Title:</b> 1. Algebra 2. Algebra 3. Algebra</p> <p><b>Knowledge/Skills:</b> 1. Plotting straight line graphs from a table of values, the equation of a line in the form <math>y = mx + c</math>, parallel lines, vertical and horizontal lines.  2. Plotting curved graphs from a table of values, general shape of quadratics, plotting quadratic graphs from a formula.  2. Simultaneous equations and their solution by graphical methods, solving simultaneous equations by elimination (no need to multiply equations first in Y8), forming simultaneous equations from worded situations.</p>	<p><b>Unit Title:</b> 1. Statistics 2. Geometry and measures 3. Geometry and measures</p> <p><b>Knowledge/Skills:</b> 1. Review averages and range including from ungrouped frequency tables, hypothesis testing and questionnaire design, stem and leaf diagrams, scatter diagrams, correlation and lines of best fit, discrete and continuous data, using inequalities to express the set of possible values of a rounding continuous quantity, bar charts for continuous data, frequency polygons, modal class for grouped data.  2. Reflecting in a mirror line, translations including representation in column vector form, order of rotational symmetry, rotations, enlargements (including with positive fractional scale factors)  3. (If time) Drawing travel graphs, relationship between speed, distance and time, interpreting travel graphs.</p>

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 7	<p><b>Unit Title:</b> 1. Probability 2. Statistics 3. Number</p> <p><b>Knowledge/Skills:</b> 1. Definitions of key terminology, probabilities of single events happening/not happening, possibility spaces, relative frequency and expected number of successes. 2. Mean, median and mode from a list and ungrouped frequency tables, comparison of data sets, investigative task – length of words. 3. HCF, LCM, indices, divisibility tests, prime factor decomposition, number sequences.</p>	<p><b>Unit Title:</b> 1. Number (cont'd) 2. Geometry and measures 3. Number</p> <p><b>Knowledge/Skills:</b> 1. Sets and Venn Diagrams, including notation for universal set (<math>\xi</math>), union (<math>\cup</math>) and intersection (<math>\cap</math>). 2. Recap terminology and angles facts from KS2, angles in triangles and quadrilaterals, types of triangle and quadrilateral, using a protractor to draw angles, using compasses to construct triangles, angles in parallel lines, basic angle proofs. 3. Negative numbers in context, <math>+</math>, <math>-</math>, <math>\times</math>, <math>\div</math> with negatives, order of operations.</p>	<p><b>Unit Title:</b> 1. Number 2. Geometry and measures</p> <p><b>Knowledge/Skills:</b> 1. Rounding (decimal places), non-calculator methods for multiplication and division (including with decimals), Converting fractions to decimals by division. 2. Metric units and prefixes, area/perimeter of compound rectangles, converting metric units of area. Areas of triangles, parallelograms and trapezia including within compound shapes, mathematical modelling – investigative task – The Quad</p>	<p><b>Unit Title:</b> 1. Number, ratio and proportion.</p> <p><b>Knowledge/Skills:</b> 1. Equivalent fractions, comparing fractions using <math>&lt;</math>, <math>&gt;</math> signs, converting between fractions, decimals and percentages, finding a fraction/percentage of a quantity, simplifying ratio and sharing quantities into a given ratio, <math>+</math>, <math>-</math>, <math>\times</math>, <math>\div</math> fractions and mixed numbers, pie charts.</p>	<p><b>Unit Title:</b> 1. Algebra</p> <p><b>Knowledge/Skills:</b> 1. Expressing formulae in words and symbols, using letters for unknown values, substituting into formulae, coordinates, using/constructing line graphs/conversion graphs, equations of straight lines.</p>	<p><b>Unit Title:</b> 1. Algebra 2. Geometry and measures 3. Geometry and measures</p> <p><b>Knowledge/Skills:</b> 1. Simplifying expressions by collecting like terms, principles of solving linear equations, solving equations with <math>x</math> on both sides, forming equations from worded situations. 2. Volume of a cuboid, drawing cuboids on isometric paper, surface area of cuboids, converting between metric units of volume, nets of 3D shapes. 3. (If time) Conversions between metric and imperial units.</p>

**Key/Legend/Notes:**

We aim to provide opportunities for students to develop key mathematical skills such as problem solving, reasoning and proof throughout the whole programme of study.