Mathematics	**Intent: To consolidate and further develop core concepts of number, algebra, geometry, ratio and proportion, statistics and probability developed in KS3. Through interleaving and spaced practice students will increase their fluency and confidence in key mathematical processes. Students will begin to make connections between more advanced mathematical concepts in order to solve a variety of problems.**				
Year 11H	**Number**	**Algebra**	**Geometry**	**Ratio & Proportion**	**Statistics & Probability**
Knowledge (facts, information, concepts and key terminology)	Surds, using surds in sequences, rationalising the denominator, writing recurring decimals as fractions, calculations with upper and lower bounds.	Solve linear and quadratic equations algebraically and graphically, quadratic formula, completing the square, turning points, straight line graphs, equation of a circle, further graphs, proof.	Parallel and collinear vectors, sine rule, cosine rule, area of a triangle, tangents to curves, areas under curves, graph transformations, loci and constructions.	Connecting multiple ratios, direct and inverse proportion, ratios across different dimensions.	Averages and spread, averages from individual and grouped data, outliers, quartiles, IQR, histograms, cumulative frequency and scatter graphs.
Understanding (ability to connect and synthesise knowledge within a context)	The difference between rational and irrational numbers. How the two types of numbers can be written using shorter notation. Which values are needed in order to generate upper and lower bounds.	The advantages and disadvantages of each method when solving quadratic equations. The nature of the graphs and how the equations and key information can be derived. The differences between common types of graphs and how transformation affect them. The necessity of proof within mathematics.	The similarities and differences between vector and coordinate geometry. Trigonometry can be extended beyond right-angled triangles to all types of triangles. Using circles to prove multiple values.	The need for commonality in order to compare across ratios. How relationships can be represented algebraically in order to calculate new values.	The differences between measures of location and measures of spread. How changes to these values affect summaries of the data. Key features of more complex statistical diagrams and how further information can be calculated from them.
Skills (successful application of knowledge and understanding to a specific task)	Combine skills across many different mathematical areas in order to simplify challenging problems. Appreciate the difference between the four operations with bounds.	Apply appropriate procedures to a variety of questions in order to answer in the most efficient way. Determine maxima and minima from equations and graphs as well as tracking them through transformations. Generalise types of numbers in order to prove results.	Convert between algebraic and geometrical representations of vectors and choose the most efficient method based upon student preferences. Apply the correct trigonometric rule depending on the context and consider the validity of each answer.	Use complex algebraic skills to solve challenging questions. Fluently convert ratios in order to make comparisons.	Identify when appropriate averages and ranges should be used based upon context. Compare two or more sets of data using relevant statistics. Evaluate the use of statistical diagrams, notably reasons for using a particular one as well as limitations.
Formal Assessments (those done by all/vast majority of the cohort)	Termly cumulative assessments covering content from start of GCSE course. Topic Assessments after each topic has been delivered.				
By the end of the year students on course for at least a grade 5 will… be proficient in using procedures to answer standard questions across all areas of mathematics. Apply concepts to unfamiliar problems using problem solving skills developed over the year.					

The timings and order of delivery shown are approximate, these may change on a class-by-class basis

Term 1

Topic	Breakdown
Algebraic Proportion	Direct proportion
	Inverse proportion
	Combining proportions
Circle Theorems	Defining the eight circle theorems
	Recognising the circle theorems
	Using circle theorems for proofs
Quadratics	Completing the square
	Turning points and graph features
	Quadratic formula
	Solving linear and quadratic sim. eq'n. s
Rational and irrational numbers	Adding and subtracting with surds
	Multiplying/dividing recap and expanding
	Geometric sequences with surd ratios
	Rationalising the denominator
	Recurring decimals
Further Trigonometry	Bearings
	Recap and exact trig values
	Area of any triangle
	Sine rule
	Cosine rule
	3D trigonometry
Bounds	Error intervals and truncation recap
	Calculations with bounds

Term 2

Topic	Breakdown
Algebraic Fractions	Adding/subtracting algebraic fractions
	Multiplying algebraic fractions
	Dividing algebraic fractions
Formulae & Functions	Rearranging harder formulae
	Introducing functions
	Inverse functions
	Composite functions
Harder Graphs	Equations of normals
	Equation of a circle
	Tangents to circles
	Graph Transformations
Pre-calculus	Tangents to curves
	Areas under curves
Quadratic Sequences	Recap of sequences
	Finding the nth term of quadratic sequences
Proof	Algebraic notation and proof
	Proving identities
Iteration	Approximating solutions
	Iterative procedures
Further Inequalities	Sketching inequalities with regions
	Set notation for solutions
	Solving quadratic inequalities

Term 3

Topic	Breakdown
Harder Ratios	Connecting multiple ratios
	Using algebra with ratios
	Ratios between lengths, areas and volumes
Further Vectors	Vector geometry
	Proofs with vectors
Histograms	Properties of histograms
	Drawing and interpreting histograms
	Statistics from histograms
Drawings	Constructions
	Loci
	Plans and elevations