



Topic name	Term	Skills developed	Prior learning	Next link in curriculum
Quadratics, expanding more than two brackets, sketching graphs, graphs of circles, cubes and quadratics	Autumn	<ul style="list-style-type: none"> Understanding of expanding brackets will be developed so that students will be able to multiply together two or three brackets with more than one term in them. Pupils will develop their understanding of solving quadratics using the following methods <ul style="list-style-type: none"> Factorising (seen before) Quadratic Formula (seen before) Completing the square An introduction to sketching functions <ul style="list-style-type: none"> Sketching quadratics and cubics Finding the turning point of a quadratic by completing the square Solve linear and quadratic simultaneous equations graphically. This builds on their understanding of how to achieve the same outcome algebraically. Solve more complex equations by using recursive iteration. 	<ul style="list-style-type: none"> Y9 legacy SOW – Expanding Brackets and Solving Equations Y10 Autumn – Quadratic, Cubic and other Graphs 	<ul style="list-style-type: none"> Further work on graphs of various functions will be seen throughout the GCSE course. The study of polynomials and other functions is seen at A-level and finding maximum and minimum points on these graphs are found using differentiation at this stage.
Circle Theorems	Autumn	<ul style="list-style-type: none"> Learn all necessary circle theorems for the GCSE syllabus. Apply the circle theorems to increasingly challenging problems. Be able to prove circle theorems. 	<ul style="list-style-type: none"> Y9 Spring – Area of Trapezia and Circles Y8 Summer – Angles in Parallel Lines and Polygons 	<ul style="list-style-type: none"> Apply the circle theorems to unfamiliar questions that involve other techniques learned earlier in the course such as Pythagoras’ Theorem and trigonometry.
Further Algebra	Autumn	<ul style="list-style-type: none"> Understanding of inverse operations to rearrange formulae. Apply understanding of the four basic operations to algebraic fractions. Factorising expressions as parts of fractions and simplifying fractions involving algebra. Learn new skills with surds such as rationalising the denominator, particularly the more 	<ul style="list-style-type: none"> Y8 Autumn – Multiplying and Dividing Fractions Y9 Autumn – Forming and Solving Equations Y10 Summer - Quadratics, expanding more than two brackets, sketching graphs, 	<ul style="list-style-type: none"> Solving increasingly challenging questions where rearranging complex formulas is necessary such as using the cosine rule. Solving complex ratio and quadratic equations which include algebraic fractions.



		<p>challenging type where the denominator has more than one term.</p> <ul style="list-style-type: none"> • Solving equations that have one, or more, algebraic fraction included in the problem. • Introduction to function notation. • Working with compound and inverse functions. • Using algebraic manipulation to prove certain mathematical statements are true. 	<p>graphs of circles, cubes and quadratics</p>	<ul style="list-style-type: none"> • Simplifying answers to a variety of questions involving surds, e.g. trigonometry problems in Paper 1 • Linking function notation and basic notation for graphs with the aim of realising they are interchangeable.
<p>Vectors and Proof</p>	<p>Autumn</p>	<ul style="list-style-type: none"> • Understand and use vector notation, including column notation, and understand and interpret vectors as displacement in the plane with an associated direction. • Understand that $2\mathbf{a}$ is parallel to \mathbf{a} and twice its length, and that \mathbf{a} is parallel to $-\mathbf{a}$ in the opposite direction. • Represent vectors, combinations of vectors and scalar multiples in the plane pictorially. • Calculate the sum of two vectors, the difference of two vectors and a scalar multiple of a vector using column vectors (including algebraic terms). • Find the length of a vector using Pythagoras' Theorem. • Calculate the resultant of two vectors. • Solve geometric problems in 2D where vectors are divided in a given ratio. • Produce geometrical proofs to prove points are collinear and vectors/lines are parallel. 	<ul style="list-style-type: none"> • Y9 Autumn – Testing Conjectures • Y9 Spring – Pythagoras' Theorem 	<ul style="list-style-type: none"> • Developing understanding of Vectors at A Level. • Problem Solving with Vectors at A Level.



Proportion	Spring	<ul style="list-style-type: none">● Interpret and analyse transformations of graphs of functions and write the functions algebraically, e.g. write the equation of $f(x) + a$, or $f(x - a)$● Apply to the graph of $y = f(x)$ the transformations $y = -f(x)$, $y = f(-x)$ for linear, quadratic, cubic function● Apply to the graph of $y = f(x)$ the transformations $y = f(x) + a$, $y = f(x + a)$ for linear, quadratic, cubic functions;● Estimate area under a quadratic or other graph by dividing it into trapezia● Recognise and interpret graphs showing direct and inverse proportion;● Identify direct proportion from a table of values, by comparing ratios of values, for x squared and x cubed relationships;● Write statements of proportionality for quantities proportional to the square, cube or other power of another quantity;● Set up and use equations to solve word and other problems involving direct proportion;● Use $y = kx$ to solve direct proportion problems, including questions where students find k, and then use k to find another value;● Solve problems involving inverse proportion using graphs by plotting and reading values from graphs;● Solve problems involving inverse proportionality;	<ul style="list-style-type: none">● Y10 Autumn – Transformations● Y10 Autumn – Quadratic, Cubic and other Graphs● Y9 Summer – Solving Ratio and Proportion Problems	<ul style="list-style-type: none">● Develop understanding of transformations of graphs (including the modulus function) at A Level.
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Key

Number	Geometry	Ratio & proportion	Algebra	Statistics
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