



Year 11 Curriculum Intent

Mathematics is a language; international, universal and timeless. We want all students to experience the beauty, power and enjoyment of Mathematics, developing a sense of curiosity about the subject with a clear understanding of many aspects. We are committed to ensuring all students are Mathematically fluent, enabling them to adapt to challenges that life presents. We foster a 'can do' attitude and we promote the fact that it is good to do 'hard things'.

Year 11 Curriculum Overview

Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
- Block 1 – Gradients and Lines - Block 2 – Non-Linear Graphs - Block 3 – Using Graphs	- Block 4 – Expanding and Factorising - Block 5 – Changing the Subject - Block 6 - Functions	- Block 7 – Multiplicative Reasoning - Block 8 – geometric Reasoning - Block 9 – Algebraic Reasoning	- Block 10 – Transforming and Constructing - Block 11 – Listing and Describing - Block 12 – Show that...	Revision and examinations	Revision and examinations

Key Question

- What is the product of the gradients of a pair of perpendicular lines? - How is Pythagoras' Theorem connected to the equation of a circle? What do we mean by the roots of a quadratic?	- Why do we use fractions rather than decimals when writing solutions? - What do x_1, x_2, x_3 etc. mean? - What does $fg(x)$ and $gf(x)$ mean?	- When is it appropriate to use the equation $y = kx$? - What is meant by the alternate segment? - Why isn't a list of examples a proof?	- Is it possible for any point to be invariant after a translation? - Do the circles in a Venn diagram always overlap? Why or why not? - How do you know when two vectors are parallel when they are written in component form?		
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Key Vocabulary

- Perpendicular - Negative reciprocal - Exponential - Asymptote - Constant - Piece-wise	- Coefficient - Binomial - Surd - Complete the square - Function - Iterate	- Constant of proportionality - Varies inversely - Cyclic quadrilateral - Tangent - Simultaneous - Proof	- Vector - Invariant - Product rule - Interquartile range - Hypothesis - Identity		
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	The knowledge you will need to recall:	How you will apply this knowledge:	This links to:
1	- Find and use equations of straight lines. Understand and use equations of perpendicular lines (Higher). - Plot and read from quadratic curves, understand and find roots, plot cubic and reciprocal graphs. Understand and use exponential graphs (Higher). - Reflect shapes in a given line, construct and interpret speed, distance and time graphs and construct and interpret real-life graphs. Find the equation of a tangent to a curve and estimate the area under a curve (Higher).	- Interpret when the structure of a numerical problem requires additive, multiplicative, or proportional reasoning. Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts. - Use mathematical language and properties precisely. Extend and formalise their knowledge of ratio and proportion in working with measures and geometry - Use mathematical language and properties precisely. Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems. Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem	- Year 8: Working in the Cartesian plane. Year 9 – Straight line graphs. Year 10 – Representing solutions of equations and inequalities. - Year 8: Working in the Cartesian plane. Year 9: Algebraic representation. Year 10: Simultaneous equations. - Year 8: Multiplicative change. Year 9: Solving ratio and proportion problems.
2	- Expand a single bracket and binomials, factorise into a single bracket, factorise quadratics of the form $x^2 + bx + c$, solve quadratic equations and simplify complex algebraic expressions including algebraic fractions. Solve quadratic equations by completing the square and using the quadratic formula (higher). - Review solving linear equations, change the subject of a formula including perimeter, area and volume formulae and volume of a pyramid. Changing the subject of a formula where the subject appears more than once and solving equations by iteration (Higher). - Find inputs and outputs, show algebraic expression are equivalent and solve problems using the kinematics formulae. Work with the composite and inverse functions (Higher).	- Select and use appropriate calculation strategies to solve increasingly complex problems, including exact calculations involving multiples of π. Use mathematical language and properties precisely. Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems. Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem - Select appropriate concepts, methods and techniques to apply to unfamiliar and nonroutine problems; interpret their solution in the context of the given problem. - Make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counter-examples; begin to use algebra to support and construct arguments (and proofs).	- Year 8: Brackets, equations and inequalities. Year 9: Testing conjectures. Year 10: Equations and inequalities. - Year 9: Forming and solving equations and inequalities. - Year 7: Understanding and using algebraic notation.
3	- Review scale and enlargement, work with direct and inverse proportion, calculate with pressure and density and determine whether a problem requires additive or multiplicative reasoning. Construct complex direct and inverse proportion equations (Higher). - Review angle facts, focusing on the language of reasons and chains of reasoning, review Pythagoras' theorem and using trigonometrical ratios. Construct formal geometric proofs, including the remaining circle theorems (Higher). - Work with complex indices, review simplification of complex expressions and finding the nth term rule, justify e.g. why a number is/isn't in a given sequence. Construct formal algebraic proofs (Higher).	- Use mathematical language and properties precisely. - Use mathematical language and properties precisely. Reason deductively in geometry, including using geometrical construction. - Use mathematical language and properties precisely. Reason deductively in geometry, including using geometrical construction. Understand similarity of triangles and of other plane shapes, use this to make geometric inferences, and solve angle problems using similarity. Extend and formalise their knowledge of ratio and proportion, in working with measures and geometry.	- Year 7: Multiplication and division. Year 8: Multiplicative change. Year 9: Solving ratio and proportion problems. - Year 7: Geometric reasoning. Year 8: Angles in parallel lines and polygons. Year 9: Pythagoras' theorem. Year 9: Deduction. Year 10: Trigonometry. Year 10: Angles and bearings. - Year 8: Sequences. Year 10: Types of number and sequences. Year 10: Indices and roots.
4	- Revisit transformations of shapes, linking to types of symmetry, perform standard constructions using ruler and protractor or ruler and compasses and solve loci problems. Understand and use trigonometrical graphs and sketch translations and reflections of the graph of a given function (Higher). - Work with organised lists, sample spaces and probability, complete and use Venn diagrams, work with plans and elevations and use data to compare distributions. Product rule for counting (Higher). - Illustrate equivalence, numerically and algebraically, justify answers, use the language of angle rules and use the conditions for congruent triangles. Formal proof with congruent triangles (Higher).	- Round answers to appropriate degree of accuracy, either to a given number of significant figures or decimal places or make a sensible decision on rounding in context of question. Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems. Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem. - Reason deductively in geometry, number and algebra, including using geometrical constructions. - Reason deductively in geometry, number and algebra, including using geometrical constructions.	- Year 7: Constructing and measuring. Year 8: Line symmetry and reflection. Year 9: Constructions and congruency. Year 9: Rotation and translation. - Year 7: Sets and probability. Year 8: Probability. Year 9 Probability. Year 10: Probability. - Year 7: Geometric reasoning.