

**Long
Term Plan**

In year 9 students develop their geometric reasoning looking at polygons before being introduced to Pythagoras' theorem and then trigonometry. In algebra students begin to form links between topics looking at using formulae for different types of problem and then working with graphs. Students develop their understanding of probability.

Year 9: Mathematics

	Learning Cycle	Key Concepts and Themes	Vocabulary
HT1	Arithmetic Expressions and formulae Angles and polygons	<ul style="list-style-type: none"> Use conventional methods for operating with fractions including converting between improper fraction and mixed numbers Expand the product of two binomials to form a quadratic expression. Rearrange formulae to change the subject. Recognise and calculate interior and exterior angle sums for polygons 	Mixed number, Improper fraction, Binomial, Quadratic, Subject (of a formula), Interior angle, Exterior angle, Tessellation
HT2	Sample spaces Ratio, percentage change Rearranging equations	<ul style="list-style-type: none"> Represent outcomes using a sample space diagram and calculate theoretical probabilities and recognise the effect of adding conditions Calculate the result of a percentage change both with and without calculator including the inverse. Calculate interest both simple and compound Set up and solve increasingly complex linear equations including brackets and fractional coefficients using formal methods. Add/subtract and simplify algebraic fractions. 	Sample space, Theoretical probability, Conditional probability, Mutually exclusive, Independent, Simple interest, Compound interest, Coefficient, Algebraic fraction
HT3	Geometrical relationships Statistics	<ul style="list-style-type: none"> Use known geometrical facts and formulae to solve problems including multi-step problems. Use Pythagoras theorem and properties of similar and congruent shapes. Use grouped data, both discrete and continuous and estimate the mean. Create and interpret stem-and-leaf plots, box-plots and frequency polygons. 	Similar, Congruent, Pythagoras' theorem, Frequency polygon, Box and whisker plot, Stem and leaf plot, Estimated mean
HT4	Mathematical modelling Using graphs to solve equations	<ul style="list-style-type: none"> Model real-life situations with expressions, formulae and graphs making links between these representations. Solve direct and inverse proportion problems informally and algebraically. Identify the key points of a parabola. Construct a parabola using a table of values or given roots and vertex. Use graphs to find solutions for quadratic equations. Use graphs to estimate solutions for simultaneous equations including quadratics. 	Direct proportion, Inverse proportion, Constant of proportionality, Parabola, Roots, Vertex, Quadratic equation, Simultaneous equations
HT5	Trigonometry Standard form Geometric sequences	<ul style="list-style-type: none"> Use Pythagoras' theorem to solve problems of lengths in 2D and 3D shapes. Use trig ratios to find missing side lengths as well as missing angles in right-angled and non-right-angled triangles. Express numbers in standard form and use standard form to calculate. Classify and represent different types of number (real, rational/irrational). Generate terms and use nth term rule to describe geometric sequences. 	Pythagoras' theorem, Hypotenuse, Trigonometry, Sine ratio, Cosine ratio, Tangent ratio, SOHCAHTOA, Standard form, Scientific notation, Rational number, Irrational number, Real number, Geometric sequence, Common ratio
HT6	Compound units Mathematical relationships	<ul style="list-style-type: none"> Use compound units for speed and density including both metric and Imperial equivalents. Calculate best value. Model situations graphically and algebraically expressing quadratic relationships. Construct and interpret graphs of cubic, reciprocal and exponential functions. 	Compound units, Density, Displacement, Value, Quadratic, Linear, Cubic, Reciprocal, Exponential

Skill Development	<ul style="list-style-type: none"> select and use appropriate calculation strategies to solve increasingly complex problems use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships reason deductively in geometry, number and algebra, including using geometrical constructions move freely between different numerical, algebraic, graphical and diagrammatic representations model situations mathematically and express the results using a range of formal mathematical representations
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