Long Term Plan		In year 10 pupils develop fluency in proportional reasoning and apply to varied problems. Pupils consider accuracy of calculations and use standard form. Pupils encounter a variety of different diagrams for solving probability problems. In algebra they study sequences and join up all their prior learning on linear algebra and quadratics as well as using function notation for the first time and formal numerical methods for solving equations. Geometric reasoning is extended to circles and trigonometry moves on to right-angled and non-right-angled triangles.		
		Learning Cycle	**Key Concepts and Themes**	**Vocabulary**
Year 10: Mathematics	**HT1**	Proportion Sequences	• Understand ratio notation and interpret ratio as a fraction, applying this to geometric problems. • Use equivalent and unitary ratios to solve problems. • Understand direct and inverse proportionality, and construct appropriate graphs. • Calculate percentage change and reverse percentage. • Calculate repeated percentage change including compound interest. • Generate linear sequences from given rules. • State nth term rule for linear sequences. • Recognise and use sequences for triangular and cube numbers. • Solve problems involving Fibonacci type sequences.	Ratio, Proportion, Unitary, Equivalent, Direct proportion, Inverse proportion, Scale factor, Enlargement, Simple interest, Compound interest, Linear sequence, Arithmetic progression, Term
	HT2	Probability: combined events Numbers and accuracy	• Understand mutually exclusive events and calculate theoretical probabilities. • Use relative frequency diagrams. • Apply the addition and multiplication rules for probability. • Construct probability tree diagrams for dependant and independent events. • Use Venn diagrams, two-way tables, listing methods and sample spaces to solve probability problems. • Round numbers to appropriate degrees of accuracy. • Write error intervals for rounded values and measurements. • Calculate with roots and indices and use rounding with mental methods to estimate calculations. • Use standard form and calculate with numbers in standard form. • Calculate with fractions to solve problems. • Simplify and calculate with surds.	Mutually exclusive, Relative frequency, Dependant, Independent, Conditional, Sample space, Error interval, Limits of accuracy, Lower and upper bounds, Standard form, Irrational number, Surd, Rationalise denominator
	HT3	Linear algebra	• Manipulate expressions by expanding brackets, simplifying indices and collecting terms. • Factorise expressions, including quadratics. • Manipulate algebraic fractions. • Write expressions and formulae. • State equations of straight lines. • Solve simultaneous linear equations including graphical solutions. • Use numerical methods to solve equations: trial and improvement and iteration.	Factorise, Expand, Binomial, Quadratic, Simultaneous equations, Iteration

HT4	Functions Circles	• Use function notation. Identify composite and inverse functions. Understand trigonometric functions and know exact values. Sketch functions: quadratic, cubic, reciprocal, exponential and trigonometric. Transform functions by translation and reflection. • Understand and apply circle theorems in geometric reasoning. State the equation of a circle and find the equation of a tangent.	Function, Inverse, Composite function, Cubic, Reciprocal. Exponential, Translation, Reflection, Chord, Tangent, Arc, Sector, Segment
HT5	Trigonometry Measures and units	• Use trigonometric functions to solve problems in right-angled triangles. • Use sine and cosine rules in non-right-angled triangles. • Use trig to find the area of a triangle. • Solve problems in similar shapes and use bearings. • Convert measures including estimated conversions for common metric/imperial measures and apply in problems. • Apply dimensional analysis. • Derive and use formulae for compound measures.	Sine, Cosine, Tangent, Pythagoras' theorem, Similar shapes, Bearings, Imperial, Dimensional analysis, Compound measure
HT6	Quadratic equations	• Solve quadratic equations by factorisation. • Approximate solutions to quadratics by graphing. • Solve quadratic equations using the quadratic formula or by completing the square. • Identify the key points of quadratic graphs and use to sketch. • Solve quadratic and linear simultaneous equations.	Root (of function), Parabola, Vertex

Skill Development	• formalise and apply knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphically • 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 • explore what can and cannot be inferred in statistical and probabilistic settings, and express arguments formally • assess the validity of an argument and the accuracy of a given way of presenting information • develop mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems and financial contexts • make and use connections between different parts of mathematics to solve problems • select appropriate concepts, methods and techniques to apply to unfamiliar and nonroutine problems; interpret solutions in the context of the given problem