

**YEAR 11 HIGHER - STUDENT CORE KNOWLEDGE**

TERM	TOPIC	DETAIL	SPARX
1	Recurring decimals	Change recurring decimals into their corresponding fractions. By writing the denominator in terms of its prime factors, decide whether fractions can be converted to recurring or terminating decimals (Recognise that every terminating decimal has its fraction with a 2 and/or 5 as a common factor in the denominator).	U550, U689
	Quadratic sequences	Continue a quadratic sequence and use the nth term to generate terms. Find the nth term of quadratic sequences	U206
	Simultaneous equations 2	Solve quadratic equations algebraically by factorising (no rearrangement required). Find approximate solutions to quadratic equations using a graph. Solve linear/quadratic simultaneous equations. Solve linear/circles simultaneous equations.	U547, U875, U269
	Further Trigonometry	Sine rule and cosine rule. Area of a triangle using trigonometry. Also use to find sides or angles of any triangle. Sketch and interpret graphs of the trigonometric functions $y = \sin x$ , $y = \cos x$ and $y = \tan x$ . Apply sine and cosine rule to questions involving bearings. Pythagoras in 3D configurations. Trigonometry in 3D configurations.	U952, U591, U592, U450, U164, U170
	Inequalities 2	Sketch a graph of a quadratic function, by factorising or by using the formula, identifying roots, y-intercept and turning point by completing the square. Solve quadratic inequalities in one variable, by factorising and sketching the graph to find critical values. Represent the solution set for inequalities using set notation, i.e. curly brackets and 'is an element of' notation e.g. the solution set of $x^2 - 3x - 10 < 0$ as $\{x: x < -3\} \cup \{x: x > 5\}$	U989, U667, U769, U133
	Functions	Find $f(x) + g(x)$ and $f(x) - g(x)$ , $2f(x)$ , $f(3x)$ etc. algebraically. Find the inverse of a linear function. Know that $f^{-1}(x)$ refers to the inverse function. Composite functions - for two functions $f(x)$ and $g(x)$ , find $gf(x)$ .	U637, U895, U448, U996
2	Iteration	Find approximate solutions to equations numerically using iteration. Use iteration with simple converging sequences	U434, U168
	Algebraic proof	Language of proof: odd, even, product, sum, integer, consecutive, square, difference etc.. Solve 'Show that' and proof questions using consecutive integers $(n, n + 1)$ , squares $a^2, b^2$ , even numbers $2n$ , odd numbers $2n + 1$ .	U582
	Circle theorems	Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results: the angle in a semicircle is a right angle; the perpendicular from the centre of a circle to a chord bisects the chord; angles in the same segment are equal; -alternate segment theorem; opposite angles of a cyclic quadrilateral sum to $180^\circ$ ; understand and use the fact that the tangent at any point on a circle is perpendicular to the radius at that point; the angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference.	U459, U251, U489, U130, U808, U807
	Histograms	Draw and interpret Histograms	U185, U814, U983, U267
	Vectors 2	Addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors. Be able to represent information graphically given column vectors. Identify two column vectors which are parallel. 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.	Solving geometric problems using vectors (U781)
	Gradients (Further), and area under a graph	Recognise and use the equation of a circle with centre at the origin. Find the equation of a tangent to a circle. Estimate area under a quadratic or other graph by dividing it into trapezia. Interpret the results in cases such distance-time graphs, velocity-time graphs and graphs in financial contexts . Interpret the gradient of linear or non-linear graphs, and estimate the gradient of a quadratic or non-linear graph at a given point by sketching the tangent and finding its gradient. Interpret the gradient of non-linear graph in curved distance-time and velocity-time graphs.	U567, U882, U800
	Graphical transformations	Translations and reflections of functions: apply to the graph of $y = f(x)$ the transformations $y = -f(x)$ , $y = f(-x)$ for linear, quadratic, cubic functions. Apply to the graph of $y = f(x)$ the transformations $y = f(x) + a$ , $y = f(x + a)$ for linear, quadratic, cubic functions. Apply to the graph of $y = f(x)$ the transformations $y = -f(x)$ , $y = f(-x)$ for sine, cosine and tan functions $f(x)$ . Apply to the graph of $y = f(x)$ the transformations $y = f(x) + a$ , $y = f(x + a)$ for sine, cosine and tan functions $f(x)$ .	U598, U487, U455
	Congruence	Identify congruent shapes by eye. Solve angle problems involving congruence Understand that distances and angles are preserved under reflections, so that any figure is congruent under this transformation. Congruence criteria for triangles (SSS, SAS, ASA, RHS).	U790, U866
Constructions & Loci	Use constructions to draw angles, lines and triangles. Understand language of bisection. Use constructions to find the loci of points satisfying specific conditions.	U678, U447, U787, U245, U187, U979, U820	
3	Revision		