

KS4 Long Term Plan

Unit	Title	Year 10	NC	Year 11	Year 11 A
1	Sequences	Identify the significant points of a quadratic function graphically. Find approximate solutions to quadratic equations using a graph. Identify roots by factorising quadratic equations of the form $x^2 + bx + c = 0$	A6 A12	Can identify arithmetic and geometric sequences and common sequences such as squares, cubes and triangular numbers. Can generate linear sequences from a given nth term rule and calculate an nth term rule from a given set of numbers. Can generate a sequence from a quadratic nth term rule	Generate a quadratic sequence from an nth term rule. Find the nth term of a quadratic sequence. Solve problems involving geometric and Fibonacci type sequences
	Prior Knowledge	9.1, 9.3, 9.8, 7.9, 8.9, 9.9		7.1 – 10.1, 7.2 – 10.2, 7.8 – 10.8, 7.9 – 10.9	7.1 – 10.1, 7.2 – 10.2, 7.8 – 10.8, 7.9 – 10.9
	Tier 3 Vocabulary	Intercept, Intersect, Roots, Solution, Stationary		Arithmetic, Generate, Geometric, Quadratic, Term	Arithmetic, Generate, Geometric, Quadratic, Term
2	Types of Number	Calculate with roots and integer indices. Understand and identify surds. Compound measure calculations involving numbers in standard form. Calculate with fractional indices.	N3 N5 A1	Can write large and small numbers in standard form. Can perform calculations involving numbers in standard form. Can calculate with roots and integer indices	Can identify and simplify surds. Can perform calculations involving surds. Can rationalise the denominator of a fraction
	Prior Knowle	7.2, 8.2, 9.2, 8.8		7.2 – 10.2, 7.8 – 10.8	7.2 – 10.2, 7.7 – 10.7, 7.8 – 10.8
	Tier 3 Vocabulary	Degree, Index, Radical, Radicand, Surd		Base, Exponent, Index, Root, Reciprocal	Audible, Irrational, Rational, Root, Surd
3	Addition and Subtraction	Understand how to add and subtract vectors. Multiply vectors by a scalar. Can use vectors to construct geometric arguments	G15	Can interpret frequency tables, bar charts, pie charts. Can work with discrete, continuous and grouped data. Can draw and interpret scatter graphs.	Can construct and analyse a histogram. Can construct and analyse a cumulative frequency graph. Can draw a boxplot from a cumulative frequency graph
	Prior Knowledge	7.3, 8.3, 9.3, 8.13		7.16 – 10.16	7.11 – 10.11, 7.5 – 10.5, 7.15 – 10.15
	Tier 3 Vocabulary	Direction, Magnitude, Resultant, Scalar, Quantity		Causation, Continuous, Correlation, Discrete, Reliability	Boxplot, Class Width, Cumulative, Frequency Density, Quartile
4	Multiplication and Division	Interpret graphs of non-standard functions in real contexts to find approximate solutions to problems, such as simple kinematic problems involving acceleration. Find an instantaneous rate of change from a graph by calculating the gradient of a tangent to the curve. Estimate the area under a curve.	A9	Can calculate the area of circles and part circles. Can find the area of compound shapes involving circles and part circles. Can find the perimeter of compound shapes involving circles and part circles	Can find missing sides and angles using the Sine Rule. Can find missing sides and angles using the Cosine rule. Can find the area of a triangle using area = $\frac{1}{2}ab\sin C$
	Prior Knowledge	9.4, 8.11, 9.11		11.2, 7.7 – 10.7, 7.8 – 10.8	10.12, 7.8 – 10.8, 7.9 – 10.9
	Tier 3 Vocabulary	Accelerate, Decelerate, Kinetic, Motion, Velocity		Arc, Chord, Diameter, Tangent, Sector	Cosine, Included Angle, Reciprocal, Sine, Triangulation
5	Rounding and Estimation	Apply and interpret limits of accuracy when rounding or truncating. Solve problems involving error intervals and upper and lower bounds.	N8	Can round numbers to decimal places and significant figures. Can use significant figures to estimate the answers to calculations. Can use inequality notation to describe an error interval	Can truncate numbers and state error intervals for measurements. Can perform calculations involving error intervals. Can apply and interpret limits of accuracy
	Prior Knowledge	7.5, 8.5, 9.5		7.5 – 10.5, 7.2 – 11.2, 7.3 – 10.3, 7.4 – 10.4	7.5 – 10.5, 7.2 – 11.2, 7.3 – 10.3, 7.4 – 10.4
	Tier 3 Vocabulary	Greatest, Least, Margin, Range, Truncate		Approximate, Bound, Degree of Accuracy, Estimate, Inequality	Approximate, Bound, Interval, Limit, Truncate
6	Fractions, Decimals and Percentages	Set up, solve and interpret the answers in growth and decay problems. Understand the difference between compound and simple interest.	R6	Can perform the four operations with mixed numbers. Can solve problems involving fractions, decimals and percentages. Can solve problems based on the use of compound interest and depreciation	Can simplify algebraic fractions. Can perform the four operations involving algebraic fractions. Can solve problems involving the use of algebraic fractions, including solving equations.
	Prior Knowledge	7.6, 8.6, 9.6		7.5 – 10.5, 7.2 – 10.2, 7.4 – 10.4	7.6 – 10.6, 7.8 – 10.8, 7.9 – 10.9, 11.2
	Tier 3 Vocabulary	Annual, Investment, Per Annum, Principal, Repeated		Compound, Depreciate, Interest, Obelus, Quotient	Coefficient, Expression, Factorise, Prove, Terminate
7	Area and Volume	Work out the volume and surface area of pyramids, cones and spheres. Calculate the surface area and volume of composite solids.	G8	Can calculate the surface area and volume of cubes, cuboids, spheres, pyramids, cylinders, cones and composite solids (some formulae given)	Recognise and use the equation of a circle with the origin as the centre. Find the equation of the tangent to a circle. Can calculate the volume of a frustum
	Prior Knowledge	7.7, 8.7, 9.7, 7.8, 8.8		7.7 – 10.7	7.8, 7.11, 8.11, 9.11
	Tier 3 Vocabulary	Apex, Conic, Hemisphere, Oblique, Slant		Apex, Conic, Hemisphere, Oblique, Slant	Disk, Distinct, Fixed, Great Circle
8	Algebraic Manipulation	Use algebra to support and construct arguments. Translate simple situations into algebraic expressions and formulae.	A3 A15	Can expand and simplify single and double brackets involving negative numbers. Can factorise linear and quadratic expressions, including the difference of two squares. Can substitute numbers into formula, including fractional and negative numbers	Can convert a recurring decimal to a fraction in its lowest terms algebraically Can factorise a quadratic expression of the form: $ax^2 + bx + c$ where $a > 1$ Can determine the co-ordinates of the turning point of a quadratic function by completing the square
	Prior Knowledge	7.7, 7.8, 8.8, 9.8		7.8 – 10.8, 7.9 – 10.9, 11.1	7.8 – 10.8, 7.9 – 10.9, 11.1
	Tier 3 Vocabulary	Argument, Conjecture, Construct, Express, Verify		Binomial, Coefficient, Factorise, Substitute, Variable	Degree, Exponent, Polynomial, Subject, Trinomial

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9	Solving Equations	Derive an equation, solve the equation and interpret the solution. Solve problems involving linear inequalities and interpret the solutions. Solve quadratic equations by using the quadratic formula, including where rearrangement is required.	A15 A16	Can solve quadratic equations by factorising. Can solve linear simultaneous equations in two variables. Can find approximate solutions graphically.	Can solve simultaneous equations in two variables algebraically (both linear and also linear/quadratic). Find approximate solutions to simultaneous equations graphically. Solve equations by iteration and solve quadratic inequalities.
	Prior Knowledge	7.9, 8.9, 9.9		7.8 – 10.8, 7.9 – 10.9, 7.10 – 10.10, 11.7	7.8 – 10.8, 7.9 – 10.9, 7.10 – 10.10, 11.7
	Tier 3 Vocabulary	Form, Function, Infer, Isolate, Represent		Balance, Coefficient, Intersect, Root, Simultaneous	Balance, Coefficient, Intersect, Iterate, Simultaneous
10	Ratio and Proportion	Identify graphs showing direct and inverse proportion and interpret related equations. Identify and work with fractions in ratio problems. Construct equations that describe direct and inverse proportion.	R3 R4 N7	Can work with fractions in ratio problems. Can compare lengths, areas and volumes using ratio notation and scale factors.	Can form and solve equations that describe direct and inverse proportion. Solve Higher GCSE ratio problems (including fractions). Work with Pythagoras in three dimensions.
	Prior Knowledge	10.6, 7.10, 8.10, 9.10, 7.11, 8.11		7.5 – 10.5, 7.10 – 10.10	7.5 – 10.5, 7.10 – 10.10
	Tier 3 Vocabulary	Dependent/Independent, Multiplicative, Origin, Relationship		Antecedent, Consequent, Dividend, Divisor, Proportionality	Antecedent, Consequent, Dividend, Divisor, Proportionality
11	Coordinates and Graphs	Recognise, sketch and interpret graphs of cubic and reciprocal functions.	A7	Can use $y = mx + c$ to identify parallel lines and co-ordinates of a y-intercept. Can find the equation of a line through 2 given points or with one point and the gradient. Can find the gradient of a line.	Can use $y = mx + c$ to identify parallel and perpendicular lines. Find the equation of a line through two given points or one point and a given gradient. Find the gradient of a linear function graphically. Calculate an estimate of the gradient of a non-linear function. Sketch and identify graphs of exponential functions
	Prior Knowledge	9.1, 10.1, 9.10, 10.10, 7.11, 8.11, 9.11		7.11 – 10.11, 7.7 – 11.7, 7.8 – 11.8	7.11 – 10.11, 7.7 – 11.7, 7.8 – 11.8
	Tier 3 Vocabulary	Asymptote, Reciprocal, Rectangular Hyperbola, Trivalent		Exponential, Gradient, Line Segment, Perpendicular, Rate of Change	Exponential, Gradient, Line Segment, Perpendicular, Rate of Change
12	Angles	Solving problems using Pythagoras' Theorem and trigonometry, including worded problems and other geometric contexts (i.e. involving isosceles triangles)	G10 G11	Can apply Pythagoras' Theorem to find lengths in right angled triangles. Can apply trigonometric ratios to find angles and lengths in right angled triangles. Can solve worded problems involving the use of Pythagoras' Theorem and trigonometry	Can apply and prove the standard circle theorems concerning angles, radii, tangents and chords.
	Prior Knowledge	7.7, 7.12, 8.12, 9.12, 9.13, 9.14		10.12, 7.8 – 10.8, 7.9 – 10.9	8.7, 7.12, 8.12, 7.8 – 10.8, 7.9 – 10.9
	Tier Three Vocabulary	Complement, Identity, Similar, Supplement, Unit (Circle)		Cosine, Hypotenuse, Sine, Tangent, Trigonometry	Alternate Segment, Cyclic, Inscribed, Segment, Subtended
13	Transformations	Enlarge a shape using fractional and negative scale factors. Perform a combination of transformations on a shape.	G1 G2	Can work with congruent and similar shapes by considering rotation, reflection, translation, enlargement (including fractional scale factors)	Recognise and transform graphs of trigonometric functions. Can work with congruent and similar shapes by considering rotation, reflection, translation, enlargement (including negative and fractional scale factors)
	Prior Knowledge	7.13, 8.13, 9.13		7.13 – 10.13	10.12, 11.6, 7.11- 10.11
	Tier 3 Vocabulary	Combine, Congruent, Invariance, Map, Similar		Centre of Rotation, Centre of Enlargement, Congruent, Similar, Translate	Amplitude, Period, Phase, Plane, Shift
14	Constructions	Construct and interpret plans and elevations of three-dimensional shapes.	G5	Can perform the standard ruler and compass constructions. Can identify the properties of 3D shapes and construct and interpret plans and elevations.	Can perform the standard ruler and compass constructions. Can identify the properties of 3D shapes and construct and interpret plans and elevations.
	Prior Knowledge	9.7, 9.14		9.7, 9.14, 10.14	9.7, 9.14, 10.14
	Tier 3 Vocabulary	Elevation, Isometric, Orthographic, Perspective, Projection		Bisect, Elevation, Isometric, Locus, Perspective	Bisect, Elevation, Isometric, Locus, Perspective
15	Probability	Use a probability model to predict the outcomes of future experiments. Calculate and interpret conditional probabilities, through representations using expected frequencies with two-way tables, tree diagrams and Venn diagrams.	P2 P3	Can calculate with relative frequency and theoretical probabilities. Can populate a Venn diagram and understand set notation.	Can construct and interpret tree diagrams. Complete Venn diagrams and use them to calculate probabilities, understanding set notation
	Prior Knowledge	10.3, 7.15, 8.15, 9.15		7.15 – 10.15	7.15 – 10.15
	Tier 3 Vocabulary	Expected, Experimental, Independent, Relative, Theoretical		Brace, Element, Intersection, Union, Universal Set	Brace, Element, Intersection, Union, Universal Set
16	Statistics	Infer properties of populations or distributions from a sample (and understand the limitations of sampling) and interpret graphical representations of data. Apply statistics to describe a population.	S1 S4 S6		
	Prior Knowledge	7.16, 8.16, 9.16			
	Tier 3 Vocabulary	Primary/Secondary, Qualitative, Quantitative, Representative			