Mathematics Year 11 Higher

Term	1				2		3		4		5	6
Topic	**Algebra 1**	**Geometry 1**	**Algebra 2**	**Number**	**Geometry 2**	**Algebra 3**	**Algebra 4**	**Top 14 topics to get a Grade 5**	**UNPACK Problem solving**	**Revision and Exam Practise**	**Revision and Exam Practise**	**Revision and Exam Practise**
Detail	Manipulate and solve quadratic equations by a variety of methods. Revise solving simultaneous equations.	Recall, apply and prove all the circle theorems	Manipulate algebra to change the subject and use and apply function notation.	Manipulate surds and rationalise the denominator of a fraction containing a surd.	Know, use and apply vector notation to find the resultant of two vectors and prove that two lines can be parallel and/or collinear.	Represent direct and inverse proportion graphically and algebraically. Find an estimate for the area under a non-linear graph. Transform graphs of functions including trigonometric and other non-linear functions.	Use the form y = mx + c to identify perpendicular lines Recognise and use the equation of a circle with centre at the origin Find the equation of a tangent to a circle at a given point	Unit 1: HCF, LCM, Primes, BIDMAS Unit 2: Area and Pythagoras Unit 3: Sequences and Forming Equations Unit 4: Brackets and Factorising Unit 5: Decimals Unit 6: Averages Unit 7: Scatter graphs Unit 8: Percentages and Ratio Unit 9: Probability Unit 10: Transformations Unit 11: Angles Unit 12: Formula Unit 13: Volume and Measure Unit 14: Best Buys	Problem solving questions on: Area and circumference of a circle Best Deal Comparing length and area Compound Area and Perimeter Compound Measure problems Exchange rates Forming and Solving equations Fractions, Decimals and Percentages Frequency Tree Diagrams HCF, LCM Money Percentage Increase and Decrease Percentages - Simple and Compound Interest Proportion Ratio of a Quantity Ratio Recipe Scale factor diagrams and map Standard form Theoretical probability	Revision and exam practise to fill any knowledge gaps.	Revision and exam practise to fill any knowledge gaps.	Revision and exam practise to fill any knowledge gaps.
Grade 8-9	Solve quadratic equations by completing the square. Create and solve simultaneous equations with one quadratic equation.		Solving and simplifying algebraic fractions. Use function notation including composite and inverse functions. Algebraic proof.	Expand and simplify expressions involving surds. Rationalise the denominator of a fraction which contains a surd.	Introduction to vector notation, finding the magnitude of a vector, represent vectors graphically and vector arithmetic. Calculate the resultant of two vectors. Solve problems involving vectors by using points as position vectors. Prove algebraically that lines are parallel and/or collinear. Solve geometric 2D problems using vector methods. Apply vector methods for simple geometric proofs.	Represent direct and inverse proportion graphically and algebraically. Estimate the area under a non-linear graph. Equation of a circle and finding the tangent of a line to a circle link this to instantaneous rate of change	Identify the equation of a circle from its graph Use the equation of a circle to draw its graph Find the equation of a tangent to circle at a given point Solve algebraic problems involving tangents to a circle			Revision and exam practise of appropriate topics	Revision and exam practise of appropriate topics	Revision and exam practise of appropriate topics
Grade 6-7	Solve quadratic equations using the quadratic formula.	Identify, use, problem solve and prove circle theorems.				Recognise and sketch graphs of exponential functions. Calculate the gradient of a tangent at a point on a graph. Transforming graphs of functions.	Know that perpendicular lines have gradients with a product of -1 Identify perpendicular lines using algebraic methods			Revision and exam practise of appropriate topics	Revision and exam practise of appropriate topics	Revision and exam practise of appropriate topics
Grade 5	Factorise expressions up to quadratic expressions. Find the roots or solution of a quadratic function. Solve simultaneous equations		Change the subject of a formula where the subject appears twice.				Find the equation of a straight line given two coordinates on the line	Percentages - Compound interest/depreciation Probability tree diagrams Enlargements	Percentages - Simple and Compound Interest	Revision and exam practise of appropriate topics	Revision and exam practise of appropriate topics	Revision and exam practise of appropriate topics
Grade 4	Solve linear equations up to the variable on both sides and including expanding brackets. Solve inequalities and represent the solution set on a number line.						Find the gradient and equation of a striaght line given the line or the gradient and y-intercept.	Forming equations Brackets and Factorising Scatter graphs Percentages - Increase/Decrease Formula Volume and Measure Best Buys	Comparing length and area Compound Measure problems	Revision and exam practise of appropriate topics	Revision and exam practise of appropriate topics	Revision and exam practise of appropriate topics
Grade 2-3	Solve equations with variable on one side. Factorising into one bracket.							HCF, LCM, Primes, BIDMAS Area, Pythagoras Sequences Brackets and Factorising Decimals Averages Percentages and Ratio Probability Transformations Angles Volume and Measure	Area and circumference of a circle Best Deal Compound Area and Perimeter Exchange rates Forming and Solving equations Fractions, Decimals and Percentages Frequency Tree Diagrams HCF, LCM Money Percentage Increase and Decrease Percentages - Simple and Compound Interest Proportion Ratio of a Quantity Ratio Recipe Scale factor diagrams and map Standard form Theoretical probability			
Keywords	unknown, solve, solution set, interval, iteration, simultaneous equations, substitution, elimination, equivalent, expression, expand, linear, quadratic, difference of two squares, binomial, factorise, manipulate, deduce, root	Radius, radii, tangent, chord, theorem, conjecture, derive, prove, proof, counterexample	equivalent, equation, expression, expand, linear, quadratic, algebraic fraction, difference of two squares, binomial, factorise	power, root, index, indices, surd, simplify, rationalise	vector, scalar, constant, magnitude	direct proportion, inverse proportion, multiplier, function, equation, linear, non-linear, quadratic, cubic. Reciprocal, exponential, parabola, asymptote, gradient, y-intercept, x-intercept, root, rate of change, sketch, plot	Function, equation, Linear, non-linear, Parallel, Perpendicular, Gradient, y-intercept, x-intercept, root, Sketch, plot, Centre (of a circle), Radius, Tangent					
Resource Links	KM: Introduce interval bisection by challenging students to find your chosen number (between 1 and 1000000) when the only clue is 'bigger' or 'smaller' after each guess. Compare the final number of guesses with 20 (since 2^{20} is close to 1000000 and students will probably have very quickly developed a process of roughly bisecting intervals). KM: Babylonian square roots – an introduction to iterative processes KM: Iteration KM: Stick on the Maths: ALG2 Simultaneous linear equations KM: Convinced?: ALG2 Simultaneous linear equations NRICH: Matchless AQA: Bridging Units Resource Pocket 4 (Skills builder 2 and 3) KM: Maths to Infinity: Brackets and Quadratics KM: Stick on the Maths: Quadratic sequences NRICH: What's possible? NRICH: Finding Factors Algebra Tiles (external site) Learning review NRICH: How old am I? NRICH: Golden thoughts Hwb: Algebra Fails	KM: Right angle challenge KM: Thales Theorem KM: 6 point circles, 8 point circles, 12 point circles KM: Dynamic diagrams NRICH: Circle theorems Hwb: Cadair Idris Hwb: Cyclic quadrilaterals	KM: Simplifying algebraic fractions KM: Maths to Infinity: Brackets and Quadratics KM: Stick on the Maths: Quadratic sequences NRICH: What's possible? NRICH: Finding Factors Algebra Tiles	wb: Q3 Manipulating sur rds Unit: N11 Manipulati NRICH: Surds	KM: Vectors NRICH: Vectors CIMT: Vectors AQA: Bridging Units: Vec	KM: Graphing proportion KM: Investigating proportionality 2 KM: Stick on the Maths NNS1: Understanding Proportionality KM: Stick on the Maths CALC1: Proportional Change and multiplicative methods KM: Convinced: NNS1: Understanding Proportionality KM: Convinced: CALC1: Proportional Change and multiplicative methods Hwb: Inverse or direct? NRICH: In Proportion KM: Autograph: Pre-Calculus Activity KM: Autograph: The numerical gradient NRICH: What's that graph? Hwb: The 100m race MAP: Representing functions of everyday situations ILIM: Interpreting Distance Time Graphs GCSE: Subject Knowledge Check - Tangents to a curve and Areas under a curve	KM: The gradient of perpendicular lines KM: Introducing the equation of a circle KM: The general equation of a circle NRICH Perpendicular lines NRICH: At Right Angles FMSP: Geogebra - Equation of a tangent to a circle					