

Year 10	Curriculum Checkpoints: What do students know and what can they do?			
Mathematics	Developing	Securing	Flourishing	Excelling
Powers and Roots	Identify squares and cubes, square roots and cube roots, calculate powers and know what numbers are "powers of"	Be able to use laws of indices and combine laws of indices	Be able to apply simple fractional and negative indices without a calculator. To be able to multiply and divide surds. To be able to simplify surds. To be able to multiply out brackets with surds in it.	Be able to solve complicated fractional and negative indices problems. To be able to rationalise the denominator. To be able to add and subtract surds. To be able to rationalise the denominator where the denominator is of the form $\pm\sqrt{\quad}$
Fractions and Decimals	Convert between mixed numbers and improper fractions, compare and order fractions, multiply fractions by fractions and integers, work one quantity out as a fraction or decimals of another quantity	Divide fractions by fractions and integers and interpret the results. Multiply and divide mixed numbers. Add and subtract fractions by writing them with a common denominator.	Add, subtract, multiply and divide mixed numbers. Add, subtract, multiply and divide decimals.	Convert between recurring decimals and fractions using a formal algebraic method. Problem solve with recurring decimals
Factors and Multiples	Write out lists of multiples and factors. Identify highest common factors and lowest common multiples from lists.	Write a number as the product of its prime factors. Identify highest common factors and lowest common multiples of larger numbers where lists are not appropriate.	To find the highest common factor and lowest common multiple of algebraic terms.	
Language of Algebra	To understand the hierarchy of operations. To write an expression given in words as algebra. To be able to multiply a numeric term across a single bracket. To be able to collect simple like terms.	To be able to multiply an algebraic term across a single bracket. To be able to collect more complicated like terms. To be able to factorise a single term from an expression.	To be able to multiply a term over a single bracket where the term has multiple variables and indices. To be able to factorise algebraic fractions to cancel them down. To be able to multiply out two expressions.	To be able to cancel down more complicated algebraic fractions. To be able to add and subtract algebraic fractions. To be able to multiply more than two binomial expressions.
Angles	To be able to use rules for angles at a point on a straight line, angles about a point and opposite angles. To be able to use rules for angles in a triangle.	To be able to use rules for angles in isosceles triangles. To know and use rules for angles in a quadrilateral. To be able to use angle rules and reason with angles in parallel lines. To be able to describe and problem solve with 3 figure bearings.	To be able to use algebra with angle rules. To know that two radii in a circle joined by a chord form an isosceles triangle.	To be able to use and apply circle theorems.
Solving Equations	Solving simple linear one step and two step equations.	Solving equations involving fractions, brackets, roots and indices, including for example $x^2=100$. Solving equations where the unknown appears on both sides.	Solving equations where the unknown appears on both sides, including those involving fractions or brackets. Solving equations where the unknown appears on the denominator of a fraction. Forming equations for solving.	
Quadratic Expressions		Factorise Monic Quadratics. Solve simple quadratic equations by factorising.	Solve quadratics using the quadratic formula. Factorise non-monic quadratics. Recognise and use difference of two squares. To be able to complete the square with a monic quadratic.	Be able to rearrange algebraic fractions to form quadratics that can be solved eg $(2x+3)/(x-5)=(x+4)/(x-9)$. To be able to solve a quadratic by completing the square. To be able to prove the quadratic formula.

Coordinates, Linear and Quadratic Graphs	Plot coordinates. Find missing coordinates in simple geometric problems. Be able to identify coordinates by reading them from scales. To be able to plot a linear graph.	Find the midpoint between two coordinates. Find the gradient of a line. To understand what the value of gradient represents. To understand the different parts of $y=mx+c$. Find missing coordinates in more complicated problems, including within gradient and midpoint problems. To be able to plot a quadratic graph. To know language associated with quadratic graphs. To be able to find a parallel gradient.	To be able to estimate the roots of a quadratic graph that they have plotted. Given a gradient and a y-intercept find the equation of a line, or find the equation of a line given an image of the line on a graph with squares. Given a gradient and a point on the line find the equation of the line. To be able to use completing the square and factorising to find the key points on quadratic graphs.	To know about the gradients of perpendicular lines. Find the equations of lines that are perpendicular to other lines, and special lines, such as perpendicular bisectors and lines connecting points of triangles.
Vectors	To know what a column vector represents and to be able to draw it. To be able to find the sum, differences and scalar products of vectors and link to visual images of these.	Recognise when lines are parallel using vectors.	Form expressions for vectors and the combination of vectors using vector algebra.	To know the conditions for algebraic vectors to be parallel. To be able to problem solve with vectors, including applying knowledge of ratios and fractions.
Simultaneous Equations	To be able to find the point of intersection of two graphs. To be able to solve very simple simultaneous equations, such as $x+y=7$, $x+2y=10$	To be able to solve simultaneous equations that require changing one of the equations, or very simple substitution.	Graph simultaneous equations and know that the intersection is the solution.	Solve simultaneous equations where one equation is linear and the other is quadratic, including graphically.
Formulae	Substitute into a simple formula.	Change the subject of a formula with a simple rearrangement. Substitute into a more complicated formula. Find the key features of a linear graph by rearranging.	Change the subject of a formula with a more complicated rearrangement, for example involving fractions or roots. Substitute into more complicated formulae.	Change the subject of a formula where the unknown appears more than once.
Sequences	Use the term-to-term rule for a sequence. Know different types of sequences and how to continue those sequences. Understand the meaning of a position to term rule and how to substitute into a position to term rule.	Create a position to term rule for an arithmetic sequence, or for a pattern of shapes. Use a position to term rule to work out the position of a term. Use a position to term rule using a complicated algebraic structure. Be able to work with more complicated term to term rules, such as Fibonacci like sequences.	To be able to create a position to term rule for a quadratic sequence.	To be able to work fluently with quadratic sequences and problem solve with quadratic sequences. To be able to find the nth term of more complicated sequences, such as $2/3$, $3/5$, $4/7...$
Ratio and Proportion	To understand what a ratio is. To be able to find equivalent ratios and simplify ratios. To be able to write ratios in the form $1:n$ or $n:1$. To know the multiplier between two parts of a ratio. Calculate unknowns from simple direct proportion, such as scaling up recipes.	To be able to share into a ratio. To be able to find a part of a ratio given another part. To be able to find the fraction of a quantity in a given ratio. Calculate more complicated unknowns from direct proportion. Use a unitary method to compare prices. Calculate unknowns from simple inverse proportion relationships.	To be able to interchange between $ax=by$ and $x:y=b:a$. To be able to problem solve with ratio.	To be able to apply algebra to ratio problems. Set up and use equations to solve word and other problems that involve direct and inverse proportion. Recognise and use graphs that represent direct proportion.

Percentages	Calculate the percentage of a quantity. Calculate a percentage increase or decrease. To know the meaning of interest and calculate simple interest.	Use a multiplier to calculate a percentage increase or decrease. To be able to calculate a multiplier for percentage change. To be able to work out a percentage change and apply a repeated percentage change. To be able to calculate compound interest. To be able to calculate a reverse percentage.	To be able to identify the difference between a percentage change and reverse percentage problem. To be able to problem solve with compound interest problems.	To appreciate a link between exponential graphs and compound interest.
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