Topic	Checklist	Tick
Basic Calculation Skills	• Use non-calculator methods to calculate with positive and negative numbers	
	• Perform operations in the correct order based on mathematical conventions	
	• Recognise inverse operations and use them to simplify and check calculations	
Whole number Theory	• Identify the properties of different sets of numbers and use the correct words to talk about them	
	• Identify prime numbers and express any whole number as a product of its prime factors	
	• Find the HCF and LCM of two numbers by listing and by prime factorisation	
Algebraic Expressions	• Use algebraic notation and write algebraic expressions	
	• Simplify and manipulate algebraic expressions	
	• Use common factors to factorise expressions	
	• Use algebra to solve problems in different contexts	
Functions and Sequences	• Generate sequences and find unknown terms in a sequence	
	• Interpret expressions as functions with inputs and outputs	
	• Work with inverse and composite functions	
	• Use correct notation to write rules or functions to find any term in a sequence	
	• Recognise and use a variety of special sequences	
Properties of shapes and solids	• Use the correct geometrical terms to talk about lines, angles and shapes	
	• Recognise and name common 2D shapes and 3D objects	
	• Describe the symmetrical properties of various polygons	
	• Classify triangles and quadrilaterals and use their properties to identify them	
Construction and Loci	• Use a ruler, protractor and a pair of compasses effectively	
	• Use a ruler and a pair of compasses to bisect lines and angles and construct perpendiculars	
	• Use construction skills to construct geometrical figures	
	• Construct accurate diagrams to solve problems involving loci	
Further algebraic expressions	• Expand the product of two or more binomial expressions	
	• Factorise quadratic expressions of the form $ax^2 + bx + c$	
	• Complete the square on a quadratic expression	
	• Simplify and manipulate algebraic fractions	
Equations	• Solve linear equations and apply them in context	
	• Solve quadratic equations	
	• Set up and solve simultaneous equations	
	• Use graphs to find approximate solutions to equations	
Angles	• Apply basic angle facts to find unknown angles	
	• Use the angles associated with parallel lines to find unknown angles in a range of figures	
	• Prove that the sum of the angles in a triangle is $180°$	
	• Use known angle facts to derive the sum of exterior and interior angles of polygons	
	• Use angle facts and properties of shapes to justify and prove results	
Fractions	• Recognise equivalence between fractions and mixed numbers	
	• Carry out the four basic operations on fractions and mixed numbers	
	• Work out fractions of an amount	

Topic	Checklist	Tick
Decimals	• Express decimals as fractions and fractions as decimals	
	• Convert decimals to fractions and fractions to decimals	
	• Order fractions and decimals	
	• Carry out the four basic operations on decimals without using a calculator	
	• Solve problems involving decimal quantities	
Units and Measurement	• Work with and convert standard units of measurement	
	• Use and convert compound units of measurement	
	• Work with map scales and bearings	
	• Construct and use scale diagrams to solve problems	
Percentages	• Change between fractions, decimals and percentages	
	• Calculate a percentage of an amount	
	• Express a quantity as a percentage of another	
	• Increase and decrease amounts by a given percentage	
	• Solve problems involving percentage change	
Algebraic Formulae	• Use formulae to express and solve problems	
	• Change the subject of a formula	
	• Substitute numbers into a formula	
	• Substitute numbers into formulae to find the value of the subject	
	• Understand and use a range of formulae, including kinematics formulae	
Perimeter	• Calculate the perimeter of simple shapes such as rectangles and triangles	
	• Calculate the circumference of a circle	
	• Calculate the perimeter of composite shapes, including circles or parts of circles	
Area	• Use formulae to find the area of different shapes, including circles and parts of circles	
	• Use appropriate formulae to calculate the area of composite shapes	
Approximation and estimation	• Approximate values by rounding them to different degrees of accuracy or truncating	
	• Use approximations to estimate and check the results of calculations	
	• Understand and apply limits of accuracy in numbers and measurements	
	• Calculate the upper and lower bounds of a calculation(for discrete and continuous quantities)	
Straight line graphs	• Use a table of values to plot graphs of linear functions	
	• Identify the main features of straight line graphs and use them to sketch graphs with equations in the form $y = mx + c$	
	• Find the equation of a straight line using the gradient and points on a line	
	• Identify parallel lines from the equation of the line in the form $y = mx + c$	
	• Identify perpendicular lines from the equation of the line in the form $y = mx + c$	
	• Find the equation of the tangent to a circle with centre (0,0)	
Graphs of equations and functions	• Plot and sketch graphs of quadratic functions	
	• Identify the main features of graphs of quadratic functions and equations	
	• Plot and sketch other polynomials and reciprocal functions	
	• Recognise and sketch graphs of exponential functions	
	• Recognise and use the equation of a circle with centre at the origin	
3-Dimensional Shapes	• Work with 2D representations of 3D objects	
	• Construct and interpret plans and elevations of 3D objects	
Volume and surface area	• Calculate the volume and surface area of cuboids and other prisms	
	• Calculate the volume and surface area of cylinders	
	• Solve volume and surface area problems involving composite shapes	

Topic	Checklist	Tick
Calculations With Ratio	• Work with equivalent ratios	
	• Divide quantities in a given ratio	
	• Identify and work with fractions in ratio problems	
	• Apply ratio to real contexts and problems, such as those involving conversion, comparison, scaling mixing and concentrations	
Basic probability and experiments	• Represent and analyse outcomes of probability experiments	
	• Relate relative frequency to theoretical probability	
	• Calculate probabilities in different contexts	
Combined events and probability diagrams	• Use a range of sample space diagrams to list outcomes of combined events	
	• Apply the addition rule and use various representations to solve probability problems	
	• Understand conditional probability and solve problems involving conditional probability	
Powers and roots	• Use positive and negative integers and fractional powers to represent numbers in index notation	
	• Calculate with powers and roots	
	• Apply the rules for multiplying and dividing indices	
Standard Form	• Convert numbers to and from standard form	
	• Use a calculator to solve problems with numbers in standard form	
	• Apply the index laws to add, subtract, multiply and divide numbers in standard form with and without using a calculator	
Surds	• Calculate exactly with surds	
	• Simplify expressions containing surds	
	• Manipulate surds	
Plane Vector Geometry	• Represent vectors as a diagram or column vector	
	• Add and subtract vectors	
	• Multiply vectors by a scalar	
	• Use vectors to construct geometric arguments and proofs	
Plane isometric transformations	• Carry out rotations, reflections and translations	
	• Identify and describe rotations, reflections and translations	
	• Describe translations using column vectors	
	• Perform multiple transformations on a shape and describe the results	
Congruent Triangles	• Prove that two triangles are congruent using the cases SSS, ASA, SAS, RHS	
	• Apply congruency in calculations and simple proofs	
Similarity	• Identify similar triangles and prove that two triangles are similar	
	• Work with positive, fractional and negative scale factors to enlarge shapes on a grid	
	• Find the scale factor and centre of enlargement of a transformation	
	• Understand the relationship between lengths, areas and volumes of similar objects	
Pythagoras' Theorem	• Develop full knowledge and understanding of Pythagoras' Theorem	
	• Apply in 2D and 3D problems	
	• Link the maths to real-life problems for industry	
Trigonometry	• Use trigonometric ratios to find lengths and angles in right-angled triangles	
	• Use the sine and cosine rules to calculate unknown sides or angles in any triangle	
	• Use the area rule to calculate the area of a triangle	
	• Solve trigonometry problems in 2D and 3D figures	
	• Recognise and sketch graphs of trigonometric functions	
Circle Theorems	• Use and apply circle definitions and understand their properties	
	• Prove and apply the standard circle theorems, using them to find related results	

Topic	Checklist	Tick
Discrete Growth and Decay	• Set up and solve problems involving growth and decay, including simple and compound interest	
	• Express exponential growth or decay as a formula	
Direct and Inverse Proportion	• Understand proportion and the equality of ratios	
	• Solve problems involving direct and inverse proportion, including graphical and algebraic representation	
	• Understand that x is inversely proportional to y is equivalent to x is proportional to $\frac{1}{y}$	
	• Interpret equations that describe direct and inverse proportion	
Collecting and Displaying Data	• Infer properties of populations or distributions from a sample, recognising the limitations of sampling	
	• Interpret and construct appropriate tables, charts and graphs for grouped and ungrouped data	
	• Choose the best form of representation for data and understand the appropriate use of different graphs	
Analysing Data	• Calculate and compare summary statistics for ungrouped and grouped data	
	• Compare distributions	
	• Draw and interpret box plots	
	• Recognise when data is being misrepresented	
	• Plot and interpret scatter diagrams and use them to describe correlation and predict results	
	• Identify outliers and understand how they can indicate errors in data	
Interpreting Graphs	• Construct and interpret graphs in real-world context	
	• Interpret the gradient of a straight line graph as a rate of change	
	• Find and interpret the gradient at a point on a curve as the instantaneous rate of change	
	• Plot and interpret graphs of non-standard functions in real contexts	
Algebraic Inequalities	• Use the correct symbols and notation to express inequalities	
	• Solve linear and quadratic inequalities in one variable and represent the solution set on a number line and in set notation	
	• Solve several linear inequalities in two variables, representing the solution set on a graph	
Transformations of curves and their equations	• Identify translations and reflections of a given graph or equation	
	• Sketch the graphs of these types of transformation	