Year 9 Scheme of Work

Unit	Key Objectives
Numbers in the Number System: Investigating Prime Factors	Use prime factorisation and a Venn diagram to find the HCF and LCM of a pair of integers Use prime factors to solve problems Identify and solve worded problems which require the use of HCF and LCM
Understanding Number: Powers and Roots	Recall and use index laws for multiplication, division, powers of powers and power of 0 Understand the meaning of reciprocal Understand that n^{-1} is equivalent to $\frac{1}{n}$ and extend to n^{-a} Use index laws to simplify algebraic expression by multiplication and division, including negative indices Convert between standard form and ordinary numbers, including numbers between 0 and 1 Order and compare numbers in standard form Estimate the value of square roots by considering values it must lie between Understand and use surd notation Simplify surd expressions by using square numbers
Algebraic Proficiency: Tinkering	Know the difference between a term, expression, equation, formula and identity Multiply a term over a single bracket, including sums of more than bracket which require subsequently collecting like terms Find the product of two brackets, including expressions such as (2x + 4)(3x – 4) Find the product of triple brackets
Algebraic Proficiency: Formulae	Use and substitute into kinematics formulae Use worded formulae e.g. cooking instructions, shoe size conversion Change the subject of formulae where x is on one side of the expression Change the subject of formulae where two or more steps are required

Solving Equations 1	Solve equations of the form $x^2 = a$, including where a is not a square number Solve quadratics of the form $x^2 + bx = 0$ by factorising Factorise quadratic expressions of the form $x^2 + bx + c$ Factorise an expression of form $x^2 – y^2$ and recognise as difference of two squares Solve quadratics of the form $x^2 + bx + c = 0$ by factorising Use solutions found by factorising to sketch a quadratic graph
Investigating Shapes: Pythagoras' Theorem	Use and recall Pythagoras' Theorem in 2D to calculate the length of any side in a right-angled triangle, including leaving answers in surd form Use Pythagoras' Theorem to justify whether a triangle is right angled Apply Pythagoras' theorem to calculate the length of a line segment
Presentation of Data: Frequency Trees and Two Way Tables	Use information provided to represent data on a frequency tree Use a frequency tree to find missing frequencies Use a frequency tree to calculate the probability of a given outcome Use information provided to represent data in a two-way table Use a two-way table to find missing frequencies Use a two-way table to calculate the probability of a given outcome
Proportional Reasoning: Ratio	Use ratio to find one quantity when the other is known Use ratio to find quantities when the difference is known Write a ratio in the form 1:n Understand and use map scales Combine ratios a:b and b:c into a single ratio a:b:c

Visualising and Constructing: Bisectors and Loci	Use straight edge and a pair of compasses for standard constructions: • perpendicular bisector of a given line • perpendicular from a point to a line • perpendicular from a given point on a line • bisector of a given angle • Angles of 30°, 45°, 60° and 90° Understand how standard constructions can represent the locus of points equidistant from one point, two points or two line segments Draw and construct diagrams from given instructions, including: • A region bounded by a circle and an intersecting line • A given distance from a point or a line • Points that are equidistant from two points or two line segments
Calculating: Addition and Subtraction	Add and subtract decimals, including numbers with different numbers of decimal places and in contexts including money Add and subtract fractions, including mixed numbers and improper fractions Add and subtract numbers in standard form, including cases where answers must then be written into correct standard form Add and subtract surds Use all of the above to: Find the perimeter of simple and compound shapes both numerically and algebraically Use perimeter to find the value of missing sides
Calculating Space: Circumference and Arc Length	Find the radius or diameter given the circumference of a circle Find the arc length and perimeter of sectors of any angle, giving answers numerically and in terms of π Calculate the perimeter of composite shapes involving circles and sectors

Visualising and Constructing: Linear Graphs	Find the gradient of a straight line; Understand that parallel lines have the same gradient; Understand and use the general equation of a straight line y=mx+c; Plot a linear graph from an equation in the form y=mx+c; Find the equation of a straight line from a graph in the form y=mx+c; Find the equation of straight lines with positive, negative and fractional gradients; Identify and interpret gradient from an equation y = mx + c; Use knowledge of parallel lines to generate the equation of a line that is parallel to a given line or to select from a list (rearranging into the form y=mx+c is not required until Y10); Understand that a straight line intersects the axis when x=0 or y=0 and use this along with y=mx+c to sketch a straight line graph; Find approximate solutions to a linear equation from a graph, including in contexts, and to estimate the value of y given a value for x; Find approximate solutions to linear simultaneous equations using graphs
Presentation of Data: Cumulative Frequency and Box Plots	Construct cumulative frequency tables Construct a cumulative frequency graph from a table Use a cumulative frequency curve to construct a cumulative frequency table Use a cumulative frequency curve to find the median, quartiles and interquartile range Construct a box plot from summary data Construct a box plot from a cumulative frequency curve and understand the link between the representations Interpret box plots to find median, quartiles and interquartile range
Investigating Shape: Angles in Polygons	Calculate the interior angle sum of a polygon Recall and use the fact that the exterior angle sum of any polygon is 360° Solve missing angle problems in regular and irregular polygons
Calculating: Multiplication and Division	Multiply and divide decimals, including numbers with different numbers of decimal places and in contexts including money Multiply and divide fractions, including mixed numbers and improper fractions Multiply and divide numbers in standard form, including cases where answers must then be written into correct standard form Multiply and divide surds

Proportional Reasoning: Percentages, Proportion and Compound Units	Calculate percentage change Calculate percentage profit or loss Find the original amount given the final amount after a percentage increase or decrease Convert between currencies, including the use of a conversion graph Solve best buy problems using a unitary method or by choosing a suitable comparable quantity Solve problems involving compound units of speed and density
Calculating Space: Sectors and Surface Area	Find the area of sectors of any angle, giving answers numerically and in terms of π Calculate the area of composite shapes involving circles and sectors Find the surface area of cuboids, triangular prisms and cylinders
Venn Diagrams	Complete Venn diagrams to enumerate two or three sets of data Use a Venn diagram to calculate the probability of a given outcome Understand which regions represent “and,” “or,” and “not” on a Venn diagram Use Venn diagrams where data is grouped rather than enumerated Use of set notation for union, intersection and complement
Investigating Shape: Similarity, Congruence and Trigonometry	Understand and use the criteria by which triangles are congruent Understand the term similar shapes and identify shapes that are similar, including all circles or all regular polygons with a given number of sides Understand that three equal angles is enough to determine similar triangles Identify the scale factor of enlargement as the ratio of two corresponding sides and use this to find missing sides (“bow tie” and triangles within triangles are not required) Understand the link between similar triangles and the trigonometric ratios Use and recall the trigonometric ratios (sine, cosine and tan) and apply them to find angles and lengths in right-angled triangles Use trigonometry to solve simple 2D problems, including angles of elevation and depression
Solving Equations 2	Solve linear equations of all types with fractional coefficients Solve equations of the form $\frac{ax}{b} + c = d$ Solve equations of the form $\frac{ax+b}{c} = d$

Algebraic Proficiency: Visualising	Generate points and plot graphs of quadratic functions Generate points and plot graphs of cubic functions Generate points and plot graphs of exponential functions Generate points and plot graphs of reciprocal functions Find approximate solutions to quadratic equations using a graph