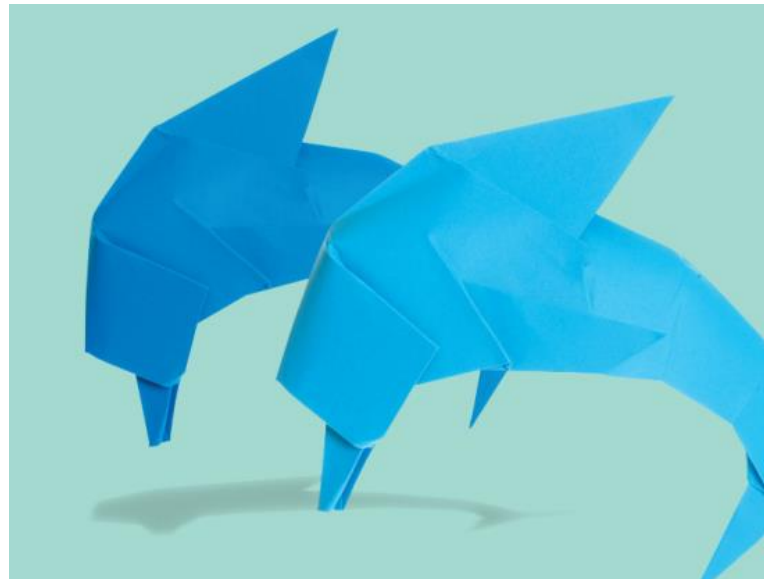


Higher GCSE (9 – 1) SoW
First teaching September 2015
First examination summer 2017



Year 10

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Year 11

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Topic 1 15 Hours		
Sub-Topic	Previous Knowledge	New Knowledge
1.1 Number problems and reasoning	<ul style="list-style-type: none"> ● Multiply numbers in a similar format to questions later in the section. ● List possible outcomes from two events. 	<ul style="list-style-type: none"> ● Work out the total number of ways of performing a series of tasks.
1.2 Place value and estimating	<ul style="list-style-type: none"> ● Estimate the value of a square root. ● Round numbers to a specified degree of accuracy. ● Apply the four operations. 	<ul style="list-style-type: none"> ● Estimate an answer. ● Use place value to answer questions.
1.3 HCF and LCM	<ul style="list-style-type: none"> ● Multiply prime factors together. ● List the factors of a number. 	<ul style="list-style-type: none"> ● Write a number of the product of its prime factors. ● Find the HCF and LCM of two numbers.
1.4 Calculating with powers (indices)	<ul style="list-style-type: none"> ● Work out simple powers. ● Apply the four operations. 	<ul style="list-style-type: none"> ● Use powers and roots in calculations. ● Multiply and divide using index laws. ● Work out a power raised to a power.
1.5 Zero, negative and fractional indices	<ul style="list-style-type: none"> ● Convert between fractions and decimals. ● Use the laws of indices for positive indices. 	<ul style="list-style-type: none"> ● Use negative indices. ● Use fractional indices.
1.6 Powers of 10 and standard form	<ul style="list-style-type: none"> ● Multiply by powers of 10 when the number is written as an ordinary number and not an index. ● Review different ways to divide by 10. ● Use negative indices. 	<ul style="list-style-type: none"> ● Write a number in standard form. ● Calculate with numbers in standard form.
1.7 Surds	<ul style="list-style-type: none"> ● Review the meaning of the dot in the recurring notation. ● Identify the missing multiple which practices the skills of searching for a perfect square factor. 	<ul style="list-style-type: none"> ● Understand the difference between rational and irrational numbers. ● Simplify a surd. ● Rationalise a denominator.

Topic 2 14 Hours		
Sub-Topic	Previous Knowledge	New Knowledge
2.1 Algebraic indices	<ul style="list-style-type: none"> ● Recognise that squaring and taking the square roots, and cubing and taking the cube root, are inverse operations. ● Calculate with powers. 	<ul style="list-style-type: none"> ● Use the rules of indices to simplify algebraic expressions.
2.2 Expanding and factorising	<ul style="list-style-type: none"> ● Simplify algebraic terms, including using index notation. ● Multiply a single term over a bracket. ● Find highest common factors. 	<ul style="list-style-type: none"> ● Expand brackets. ● Factorise algebraic expressions.
2.3 Equations	<ul style="list-style-type: none"> ● Solve a simple equation expressed in words. ● Solve simple algebraic equations ● Find lowest common multiples. 	<ul style="list-style-type: none"> ● Solve equations involving brackets and numerical fractions. ● Use equations to solve problems.
2.4 Formulae	<ul style="list-style-type: none"> ● Substitute values into a one-step formula. ● Write numbers in standard form. 	<ul style="list-style-type: none"> ● Substitute numbers into formulae. ● Rearrange formulae. ● Distinguish between expressions, equations, formulae and identities.
2.5 Linear sequences	<ul style="list-style-type: none"> ● Find the next term of a given arithmetic sequence. ● Substitute values in a simple linear expression. ● Write terms in a sequence given the nth term. ● Use a function machine to find outputs. 	<ul style="list-style-type: none"> ● Find a general formula for the nth term of an arithmetic sequence. ● Determine whether a particular number is a term of a given arithmetic sequence.
2.6 Non-linear sequences	<ul style="list-style-type: none"> ● Find the next term of given sequences. ● Identify arithmetic and geometric sequences. ● Find the term-to-term rule for a sequence. 	<ul style="list-style-type: none"> ● Solve problems using geometric sequences. ● Work out terms in Fibonacci-like sequences. ● Find the nth term of a quadratic sequence.
2.7 More expanding and factorising	<ul style="list-style-type: none"> ● Recalling a square root. ● Finding the factor pairs of small integers. 	<ul style="list-style-type: none"> ● Expand the product of two brackets. ● Use the difference of two squares. ● Factorise quadratics of the form $x^2 + bx + c$.

Topic 3 9 Hours

3a – Averages and range

3b – Representing and interpreting data and scatter graphs

Sub-Topic	Previous Knowledge	New Knowledge
3.1 Statistical diagrams 1	<ul style="list-style-type: none">● Work out mode, median and range from a list of numbers.	<ul style="list-style-type: none">● Construct and use back-to-back stem and leaf diagrams.● Construct and use frequency polygons and pie charts.
3.2 Time series	<ul style="list-style-type: none">● Identify trends by noticing whether sequences of numbers increase, decrease or oscillate.	<ul style="list-style-type: none">● Plot and interpret time series graphs.● Use trends to predict what might happen in the future.
3.3 Scatter graphs	<ul style="list-style-type: none">● Recognise when a line has a positive, negative or zero gradient.● Plot points on a coordinate grid, and identify points that do not lie on a straight line.	<ul style="list-style-type: none">● Plot and interpret scatter graphs.● Determine whether or not there is a linear relationship between two variables.
3.4 Line of best fit	<ul style="list-style-type: none">● Understand and be able to define the meaning of correlation.● Read values from graphs.	<ul style="list-style-type: none">● Draw a line of best fit on a scatter graph.● Use the line of best fit to predict values.
3.5 Averages and range	<ul style="list-style-type: none">● Find the range of a list of numbers.● Find the midpoint of two numbers.	<ul style="list-style-type: none">● Decide which average is best for a set of data.● Estimate the mean and range from a grouped frequency table.● Find the modal class and the group containing the median.
3.6 Statistical diagrams 2	<ul style="list-style-type: none">● Use subtraction to find missing values.● Draw a bar chart.● Draw a pie chart.	<ul style="list-style-type: none">● Construct and use two-way tables.● Choose appropriate diagrams to display data.● Recognise misleading graphs.

Topic 4 18 Hours

4a – Fractions and percentages

4b – Ratio and proportion

Sub-Topic	Previous Knowledge	New Knowledge
4.1 Fractions	<ul style="list-style-type: none">● Identify unit fractions, improper fractions and mixed numbers.● Multiply a whole number by a fraction.● Know the priority of operations.	<ul style="list-style-type: none">● Add, subtract, multiply and divide fractions and mixed numbers.● Find the reciprocal of an integer, decimal or fraction.
4.2 Ratios	<ul style="list-style-type: none">● Multiply a fraction by its reciprocal for a product of 1.● Simplify ratios.● Write ratios in the form $n : 1$.	<ul style="list-style-type: none">● Write ratios in the form $1 : n$ or $n : 1$.● Compare ratios.● Find quantities using ratios.● Solve problems involving ratios.
4.3 Ratio and proportion	<ul style="list-style-type: none">● Write one number as a proportion of the total.● Identify equivalent ratios.	<ul style="list-style-type: none">● Convert between currencies and measures.● Recognise and use direct proportion.● Solve problems involving ratios and proportion.
4.4 Percentages	<ul style="list-style-type: none">● Find a percentage of a given amount.● Work out percentage multipliers.	<ul style="list-style-type: none">● Work out percentage increases and decreases.● Solve real-life problems involving percentages.
4.5 Fractions, decimals and percentages	<ul style="list-style-type: none">● Convert between fractions, decimals and percentages.● Solve simple equations.	<ul style="list-style-type: none">● Calculate using fractions, decimals and percentages.● Convert a recurring decimal to a fraction.

Topic 5 12 Hours

5a – Polygons, angles and parallel lines

5b – Pythagoras' theorem and trigonometry

Sub-Topic	Previous Knowledge	New Knowledge
5.1 Angle properties of triangles and quadrilaterals	<ul style="list-style-type: none">● Recognise special types of triangle and quadrilateral.● Recall basic angle facts.	<ul style="list-style-type: none">● Derive and use the sum of angles in a triangle and in a quadrilateral.● Derive and use the fact that the exterior angle of a triangle is equal to the sum of the two opposite interior angles.
5.2 Interior angles of a polygon	<ul style="list-style-type: none">● Name polygons and understand the meaning of 'regular polygon'.● Substitute numbers into an expression.● Find missing angles in triangles, quadrilaterals and at a point.	<ul style="list-style-type: none">● Calculate the sum of the interior angles of a polygon.● Use the interior angles of polygons to solve problems.
5.3 Exterior angles of a polygon	<ul style="list-style-type: none">● Find missing angles on a straight line.● Calculate the sum of interior angles of a polygon.	<ul style="list-style-type: none">● Know the sum of the exterior angles of a polygon.● Use the angles of polygons to solve problems.
5.4 Pythagoras' theorem 1	<ul style="list-style-type: none">● Recall square numbers and square roots.● Find the area of a square.	<ul style="list-style-type: none">● Calculate the length of the hypotenuse in a right-angled triangle.● Solve problems using Pythagoras' theorem.
5.5 Pythagoras' theorem 2	<ul style="list-style-type: none">● Find square roots.● Recognise perfect squares.● Use Pythagoras' theorem to find the length of the hypotenuse.	<ul style="list-style-type: none">● Calculate the length of a shorter side in a right-angled triangle.● Solve problems using Pythagoras' theorem.
5.6 Trigonometry 1	<ul style="list-style-type: none">● Convert fractions to decimals.● Identify the hypotenuse.● Use the angle sum of a triangle to work out missing angles.	<ul style="list-style-type: none">● Use trigonometric ratios to find lengths in a right-angled triangle.● Use trigonometric ratios to solve problems.
5.7 Trigonometry 2	<ul style="list-style-type: none">● Identify the opposite and adjacent sides of a given angle in right-angled triangles.● Use the trigonometric ratios to find lengths in right-angled triangles.	<ul style="list-style-type: none">● Use trigonometric ratios to calculate an angle in a right-angled triangle.● Find angles of elevation and angles of depression.● Use trigonometric ratios to solve problems.● Know the exact values of the sine, cosine and tangent of some angles.

Topic 6 19 Hours

Sub-Topic	Previous Knowledge	New Knowledge
6.1 Linear graphs	<ul style="list-style-type: none"> ● Identify positive and negative gradients and intercepts from graphs. ● Rearrange equations. 	<ul style="list-style-type: none"> ● Find the gradient and y-intercept from a linear equation. ● Rearrange an equation into the form $y = mx + c$. ● Compare two graphs from their equations. ● Plot graphs with equations $ax + by = c$.
6.2 More linear graphs	<ul style="list-style-type: none"> ● Identify lines with the same gradient or y-intercept from their equations. ● Write the equation of a line from a graph. 	<ul style="list-style-type: none"> ● Sketch graphs using the gradient and intercepts. ● Find the equation of a line, given its gradient and one point on the line. ● Find the gradient of a line through two points.
6.3 Graphing rates of change	<ul style="list-style-type: none"> ● Find speed from given distance and time. ● Find the area of triangles and rectangles. 	<ul style="list-style-type: none"> ● Draw and interpret distance–time graphs. ● Calculate average speed from a distance–time graph. ● Understand velocity–time graphs. ● Find acceleration and distance from velocity–time graphs.
6.4 Real-life graphs	<ul style="list-style-type: none"> ● Write the equation of a line from a sketch graph. ● Plot a graph using values given in a table. 	<ul style="list-style-type: none"> ● Draw and interpret real-life linear graphs. ● Recognise direct proportion. ● Draw and use a line of best fit.
6.5 Line segments	<ul style="list-style-type: none"> ● Identify parallel and perpendicular lines ● Know properties of gradients of parallel lines. ● Identify the gradient and intercept from an equation in the form $y = mx + c$. 	<ul style="list-style-type: none"> ● Find the coordinates of the midpoint of a line segment. ● Find the gradient and length of a line segment. ● Find the equations of lines parallel or perpendicular to a given line.
6.6 Quadratic graphs	<ul style="list-style-type: none"> ● Identify quadratic expressions. ● Write the equation of a line from a graph. 	<ul style="list-style-type: none"> ● Draw quadratic graphs. ● Solve quadratic equations using graphs. ● Identify the line of symmetry of a quadratic graph. ● Interpret quadratic graphs relating to real-life situations.
6.7 Cubic and reciprocal graphs	<ul style="list-style-type: none"> ● Know the shape of linear and quadratic graphs. 	<ul style="list-style-type: none"> ● Draw graphs of cubic functions. ● Solve cubic equations using graphs. ● Draw graphs of reciprocal functions. ● Recognise a graph from its shape.
6.8 More graphs	<ul style="list-style-type: none"> ● Match the shape of a container to the graph of depth of water against time. ● Read values from graphs. 	<ul style="list-style-type: none"> ● Interpret linear and non-linear real-life graphs. ● Draw the graph of a circle.

Topic 7 17 Hours

7a – Perimeter, area and circles

7b – 3D forms and volume, cylinders, cones & spheres

7c – Accuracy and bounds

Sub-Topic	Previous Knowledge	New Knowledge
7.1 Perimeter and area	<ul style="list-style-type: none">● Recognising units of length (perimeter) and area.● Work out the area and perimeter of rectangles, triangles and parallelograms.	<ul style="list-style-type: none">● Find the perimeter and area of compound shapes.● Recall and use the formula for the area of a trapezium.
7.2 Units and accuracy	<ul style="list-style-type: none">● Recall the formulae for the area of quadrilaterals and triangles. Identify the possible integer values of x from an inequality.● Round numbers to a specified degree of accuracy.● Work out percentages of quantities.	<ul style="list-style-type: none">● Convert between metric units of area.● Calculate the maximum and minimum possible values of a measurement.
7.3 Prisms	<ul style="list-style-type: none">● Calculate the volume and surface area of a cuboid.● Calculate the volume of a shape made from cuboids.	<ul style="list-style-type: none">● Convert between metric units of volume.● Calculate volumes and surface areas of prisms.
7.4 Circles	<ul style="list-style-type: none">● Understand 'radius' and 'diameter'.● Solve and rearrange simple equations.	<ul style="list-style-type: none">● Calculate the area and circumference of a circle.● Calculate area and circumference in terms of π.
7.5 Sectors of circles	<ul style="list-style-type: none">● Work out fractions of a circle given the angle of a sector.● Simplify equations.	<ul style="list-style-type: none">● Calculate the perimeter and area of semicircles and quarter circles.● Calculate arc lengths, angles and areas of sectors of circles.
7.6 Cylinders and spheres	<ul style="list-style-type: none">● Find the area and circumference of a circle in terms of π.● Sketch a net of a cylinder.● Solve simple equations.	<ul style="list-style-type: none">● Calculate volume and surface area of a cylinder and a sphere.● Solve problems involving volumes and surface areas.
7.7 Pyramids and cones	<ul style="list-style-type: none">● Find the volume of a cube.● Find the side length of a cube given its volume.● Calculate the area of a triangle.● Use Pythagoras' theorem to work out the length of the hypotenuse.	<ul style="list-style-type: none">● Calculate volume and surface area of pyramids and cones.● Solve problems involving pyramids and cones.

Topic 8 13 Hours

8a – Transformations

8b – Constructions, loci and bearings

Sub-Topic	Previous Knowledge	New Knowledge
8.1 3D solids	<ul style="list-style-type: none">● Draw 3D shapes on an isometric grid.● Recognise dimensions of a cuboid.	<ul style="list-style-type: none">● Draw plans and elevations of 3D solids.
8.2 Reflection and rotation	<ul style="list-style-type: none">● Draw simple straight lines on a coordinate grid.● Know whether the image is congruent to the original following a reflection or a rotation.	<ul style="list-style-type: none">● Reflect a 2D shape in a mirror line.● Rotate a 2D shape about a centre of rotation.● Describe reflections and rotations.
8.3 Enlargement	<ul style="list-style-type: none">● Enlarge shapes on a coordinate grid in one quadrant.	<ul style="list-style-type: none">● Enlarge shapes by fractional and negative scale factors about a centre of enlargement.
8.4 Transformations and combinations of transformations	<ul style="list-style-type: none">● Describe translations	<ul style="list-style-type: none">● Translate a shape using a vector.● Carry out and describe combinations of transformations.
8.5 Bearings and scale drawings	<ul style="list-style-type: none">● Convert metric measures and apply to scales.● Accurate drawing of right-angled triangle.	<ul style="list-style-type: none">● Draw and use scales on maps and scale drawings.● Solve problems involving bearings.
8.6 Constructions 1	<ul style="list-style-type: none">● Accurate drawings of triangles given SSS and ASA.● Know the meaning of the terms perpendicular, bisect, arc.	<ul style="list-style-type: none">● Construct triangles using a ruler and compasses.● Construct the perpendicular bisector of a line.● Construct the shortest distance from a point to a line using a ruler and compasses.
8.7 Constructions 2	<ul style="list-style-type: none">● Draw angles with a protractor.● Construct triangles and deduce information from them.	<ul style="list-style-type: none">● Bisect an angle using a ruler and compasses.● Construct angles using a ruler and compasses.● Construct shapes made from triangles using a ruler and compasses.
8.8 Loci		<ul style="list-style-type: none">● Draw a locus.● Use loci to solve problems.

Topic 9 13 Hours

9a – Solving quadratic and simultaneous equations

9b – Inequalities

Sub-Topic	Previous Knowledge	New Knowledge
9.1 Solving quadratic equations 1	<ul style="list-style-type: none">● Know that a square has two possible roots● Find the factors of a given number.● Factorise expressions.● Solve simple equations containing a squared term.	<ul style="list-style-type: none">● Find the roots of quadratic functions.● Rearrange and solve simple quadratic equations.
9.2 Solving quadratic equations 2	<ul style="list-style-type: none">● Understand the term quadratic● Find positive and negative square roots.● Solve quadratic equations by factorising.● Expand two pairs of brackets.● Simplify surds.	<ul style="list-style-type: none">● Solve more complex quadratic equations.● Use the quadratic formula to solve a quadratic equation.
9.3 Completing the square	<ul style="list-style-type: none">● Expand and simplify a square bracket.● Simplify surds.● Solve simple equations, giving the answer in surd form.	<ul style="list-style-type: none">● Complete the square for a quadratic expression.● Solve quadratic equations by completing the square.
9.4 Solving simple simultaneous equations	<ul style="list-style-type: none">● Substitute into simple algebraic expressions.● Rearrange equations.	<ul style="list-style-type: none">● Solve simple simultaneous equations.● Solve simultaneous equations for real-life situations.
9.5 More simultaneous equations	<ul style="list-style-type: none">● Recall the equation of a straight line.● Solve simple simultaneous equations.	<ul style="list-style-type: none">● Use simultaneous equations to find the equation of a straight line.● Solve linear simultaneous equations where both equations are multiplied.● Interpret real-life situations involving two unknowns and solve them.
9.6 Solving linear and quadratic simultaneous equations	<ul style="list-style-type: none">● Identify different types of equations.● Solve quadratic equations.	<ul style="list-style-type: none">● Solve simultaneous equations with one quadratic equation.● Use real-life situations to construct quadratic and linear equations and solve them.
9.7 Solving linear inequalities	<ul style="list-style-type: none">● Understand inequality signs● Construct correct inequalities from given information	<ul style="list-style-type: none">● Solve inequalities and show the solution on a number line and using set notation.

Topic 10 8 Hours

10a – Probability

Sub-Topic	Previous Knowledge	New Knowledge
10.1 Combined events	<ul style="list-style-type: none">● List all outcomes for a single event systematically.● List all outcomes for two events systematically.	<ul style="list-style-type: none">● Use the product rule for finding the number of outcomes for two or more events.● List all the possible outcomes of two events in a sample space diagram.
10.2 Mutually exclusive events	<ul style="list-style-type: none">● Add decimals. Subtract decimals and fractions from 1.● Understand the relationship between ratios and fractions.	<ul style="list-style-type: none">● Identify mutually exclusive outcomes and events.● Find the probabilities of mutually exclusive outcomes and events.● Find the probability of an event not happening.
10.3 Experimental probability	<ul style="list-style-type: none">● Simplify fractions.● Multiply whole numbers by decimals.	<ul style="list-style-type: none">● Work out the expected results for experimental and theoretical probabilities.● Compare real results with theoretical expected values to see if a game is fair.
10.4 Independent events and tree diagrams	<ul style="list-style-type: none">● Add and multiply fractions and decimals.	<ul style="list-style-type: none">● Draw and use frequency trees.● Calculate probabilities of repeated events.● Draw and use probability tree diagrams.
10.5 Conditional probability	<ul style="list-style-type: none">● Know that the probability of something not happening is 1 minus the probability of the event happening.● Draw and use probability tree diagrams.	<ul style="list-style-type: none">● Decide if two events are independent.● Draw and use tree diagrams to calculate conditional probability.● Draw and use tree diagrams without replacement.● Use two-way tables to calculate conditional probability.
10.6 Venn diagrams and set notation	<ul style="list-style-type: none">● Interpret inequalities.● Use Venn diagrams.	<ul style="list-style-type: none">● Use Venn diagrams to calculate conditional probability.● Use set notation.

Topic 11 8 Hours

11a - Multiplicative Reasoning

Sub-Topic	Previous Knowledge	New Knowledge
11.1 Growth and decay	<ul style="list-style-type: none">● Understand the use of indices.● Work out the decimal multiplier for a percentage increase/decrease.	<ul style="list-style-type: none">● Find an amount after repeated percentage changes.● Solve growth and decay problems.
11.2 Compound measures	<ul style="list-style-type: none">● Calculate simple rates.● Substitute numbers into equations, and solve for the unknown.● Use speed = distance/time to solve problems.	<ul style="list-style-type: none">● Calculate rates.● Convert between metric speed measures.● Use a formula to calculate speed and acceleration.
11.3 More compound measures	<ul style="list-style-type: none">● Convert between metric units.● Recall the formulae for the area of a circle and volume of a prism.	<ul style="list-style-type: none">● Solve problems involving compound measures.
11.4 Ratio and proportion	<ul style="list-style-type: none">● Rearrange formulae.● Recognise graphs of $y = x$ and $y = 1/x$.● Find the gradient of a line given its equation.● Decide whether quantities are in direct proportion.	<ul style="list-style-type: none">● Use relationships involving ratio.● Use direct and indirect proportion.

Topic 12 6 Hours

12a – Similarity and congruence in 2D and 3D

Sub-Topic	Previous Knowledge	New Knowledge
12.1 Congruence	<ul style="list-style-type: none">● Know the angle sum of interior angles of a triangle.● Recognise congruent shapes.● Recall basic angle facts.● Find missing lengths using Pythagoras' theorem.	<ul style="list-style-type: none">● Show that two triangles are congruent.● Know the conditions of congruence.
12.2 Geometric proof and congruence	<ul style="list-style-type: none">● Know the conditions of congruence and use correct mathematical notation for equal angles and sides.● Recall the properties of special triangles and quadrilaterals.	<ul style="list-style-type: none">● Prove shapes are congruent.● Solve problems involving congruence.
12.3 Similarity	<ul style="list-style-type: none">● Use geometric properties to find similarities and differences between given polygons.● Calculate scale factors.	<ul style="list-style-type: none">● Use the ratio of corresponding sides to work out scale factors.● Find missing lengths on similar shapes.
12.4 More similarity	<ul style="list-style-type: none">● Find area scale factor, given length scale factor.	<ul style="list-style-type: none">● Use similar triangles to work out lengths in real life.● Use the link between linear scale factor and area scale factor to solve problems.
12.5 Similarity in 3D solids	<ul style="list-style-type: none">● Work out the volume and surface area of a cube.● Convert between metric units.● Work out cubes and cube roots.	<ul style="list-style-type: none">● Use the link between scale factors for length, area and volume to solve problems.

Topic 13		15 Hours
Sub-Topic	Previous Knowledge	New Knowledge
13.1 Accuracy	<ul style="list-style-type: none"> ● Find upper and lower bounds of a given measurement. 	<ul style="list-style-type: none"> ● Understand and use upper and lower bounds in calculations involving trigonometry.
13.2 Graph of the sine function	<ul style="list-style-type: none"> ● Know the exact values of $\sin \theta$ for $\theta = 30^\circ, 45^\circ, 60^\circ$ and 90° ● Use Pythagoras' theorem. ● Find angles using the sin function. 	<ul style="list-style-type: none"> ● Understand how to find the sine of any angle. ● Know the graph of the sine function and use it to solve equations.
13.3 Graph of the cosine function	<ul style="list-style-type: none"> ● Know the exact values of $\cos \theta$ for $\theta = 30^\circ, 45^\circ, 60^\circ$ and 90° ● Use Pythagoras' theorem. ● Find angles using the cos function. 	<ul style="list-style-type: none"> ● Understand how to find the cosine of any angle. ● Know the graph of the cosine function and use it to solve equations.
13.4 The tangent function	<ul style="list-style-type: none"> ● Know the exact values of $\tan \theta$ for $\theta = 30^\circ, 45^\circ, 60^\circ$ ● Use Pythagoras' theorem. ● Find angles using the tan function. 	<ul style="list-style-type: none"> ● Understand how to find the tangent of any angle. ● Know the graph of the tangent function and use it to solve equations.
13.5 Calculating areas and the sine rule	<ul style="list-style-type: none"> ● Calculate the area of a triangle using $(1/2)b \times h$ ● Know the formula for calculating the area of a circle. ● Use trigonometry 	<ul style="list-style-type: none"> ● Find the area of a triangle and a segment of a circle. ● Use the sine rule to solve 2D problems.
13.6 The cosine rule and 2D trigonometric problems	<ul style="list-style-type: none"> ● Use bearings ● Calculate the area of a triangle. ● Solve calculations. 	<ul style="list-style-type: none"> ● Use the cosine rule to solve 2D problems. ● Solve bearings problems using trigonometry.
13.7 Solving problems in 3D	<ul style="list-style-type: none"> ● Use the sine and cosine rule. 	<ul style="list-style-type: none"> ● Use Pythagoras' theorem in 3D. ● Use trigonometry in 3D.
13.8 Transforming trigonometric graphs 1	<ul style="list-style-type: none"> ● Reflect and rotate a coordinate point. ● Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60° ● Sketch $y = \sin x, y = \cos x$ and $y = \tan x$ for x from 0° to 360° 	<ul style="list-style-type: none"> ● Recognise how changes in a function affect trigonometric graphs.
13.9 Transforming trigonometric graphs 2	<ul style="list-style-type: none"> ● Translate coordinate points by column vectors. ● Understand negative translations. 	<ul style="list-style-type: none"> ● Recognise how changes in a function affect trigonometric graphs.

Topic 14 10 Hours

14a – Collecting data

14b – Cumulative frequency, box plots and histograms

Sub-Topic	Previous Knowledge	New Knowledge	
14.1 Sampling	<ul style="list-style-type: none">● Use fractions and percentages to work out data from a table.	<ul style="list-style-type: none">● Understand how to take a simple random sample.● Understand how to take a stratified sample.	
14.2 Cumulative frequency	<ul style="list-style-type: none">● Find the median of a data set.	<ul style="list-style-type: none">● Draw and interpret cumulative frequency tables and diagrams.● Work out the median, quartiles and interquartile range from a cumulative frequency diagram.	
14.3 Box plots	<ul style="list-style-type: none">● Find the median and range from a stem-and-leaf diagram.	<ul style="list-style-type: none">● Find the quartiles and the interquartile range from stem-and-leaf diagrams.● Draw and interpret box plots.	
14.4 Drawing histograms	<ul style="list-style-type: none">● Division calculations● Draw a frequency diagram.● Write the modal class● Estimate the mean mass.	<ul style="list-style-type: none">● Understand frequency density.● Draw histograms.	
14.5 Interpreting histograms	<ul style="list-style-type: none">● Write the modal class● Estimate the mean mass.	<ul style="list-style-type: none">● Interpret histograms.	
14.6 Comparing and describing populations	<ul style="list-style-type: none">● Work out the mean, median and mode of data sets.● Work out the mean and range from a table.	<ul style="list-style-type: none">● Compare two sets of data.	

Topic 15 7 Hours

15a – Quadratics, expanding more than two brackets, sketching graphs, graphs of circles, cubes and quadratics

Sub-Topic	Previous Knowledge	New Knowledge	
15.1 Solving simultaneous equations graphically	<ul style="list-style-type: none">● Know and draw graphs of circles.	<ul style="list-style-type: none">● Solve simultaneous equations graphically.	
15.2 Representing inequalities graphically	<ul style="list-style-type: none">● Know which integers satisfy an inequality● Solve inequalities with one variable and show solution using set notation.	<ul style="list-style-type: none">● Represent inequalities on graphs.● Interpret graphs of inequalities.	
15.3 Graphs of quadratic functions	<ul style="list-style-type: none">● Solve quadratic equations by factorising.● Sketch simple quadratic graphs● Find coordinates of maximum point.	<ul style="list-style-type: none">● Recognise and draw quadratic functions.	
15.4 Solving quadratic equations graphically	<ul style="list-style-type: none">● Understand maximum and minimum points.● Find roots of an equation by completing the square and using the quadratic formula.	<ul style="list-style-type: none">● Find approximate solutions to quadratic equations graphically.● Solve quadratic equations using an iterative process.	
15.5 Graphs of cubic functions	<ul style="list-style-type: none">● Know where a graph will cross the x-axis● Expand and simplify double brackets● Find roots of a quadratic equation by completing the square	<ul style="list-style-type: none">● Find the roots of cubic equations.● Sketch graphs of cubic functions.● Solve cubic equations using an iterative process.	

Topic 16 10 Hours

16a – Circle theorems

16b – Circle geometry

Sub-Topic	Previous Knowledge	New Knowledge
16.1 Radii and chords	<ul style="list-style-type: none">● Recall the properties of an isosceles triangle and the language of a circle.● Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)	<ul style="list-style-type: none">● Solve problems involving angles, triangles and circles.● Understand and use facts about chords and their distance from the centre of a circle.● Solve problems involving chords and radii.
16.2 Tangents	<ul style="list-style-type: none">● Recall that the line drawn from the centre of a circle to the midpoint of a chord is at right angles to the chord.● Know that the sum of the angles in a triangle must be 180°● Recall the correct maths language for parts of a circle	<ul style="list-style-type: none">● Understand and use facts about tangents at a point and from a point.● Give reasons for angle and length calculations involving tangents.
16.3 Angles in circles 1	<ul style="list-style-type: none">● Recall simple maths facts.● Recall the correct maths language for parts of a circle	<ul style="list-style-type: none">● Understand, prove and use facts about angles subtended at the centre and the circumference of circles.● Understand, prove and use facts about the angle in a semicircle being a right angle.● Find missing angles using these theorems and give reasons for answers.
16.4 Angles in circles 2	<ul style="list-style-type: none">● Recall sum of angles of a triangle and a quadrilateral● Recall correct maths language for parts of a circle.	<ul style="list-style-type: none">● Understand, prove and use facts about angles subtended at the circumference of a circle.● Understand, prove and use facts about cyclic quadrilaterals.● Prove the alternate segment theorem.
16.5 Applying circle theorems	<ul style="list-style-type: none">● Understand that $x^2 + y^2 = r^2$ is the equation of a circle with centre at the origin.● Find the gradient of a line from its equation and know the gradient of a line perpendicular to it.● Find the equation of the straight line, given a gradient and a coordinate.● Recall circle theorems	<ul style="list-style-type: none">● Solve angle problems using circle theorems.● Give reasons for angle sizes using mathematical language.● Find the equation of the tangent to a circle at a given point.

Topic 17 7 hours

17a - Changing the subject of formulae (more complex), algebraic fractions, solving equations arising from algebraic fractions, rationalising surds, proof

Sub-Topic	Previous Knowledge	New Knowledge	
17.1 Rearranging formulae	<ul style="list-style-type: none">● Substitute into linear equations.● Change the subject of a formula.● Factorise linear expressions.	<ul style="list-style-type: none">● Change the subject of a formula where the power of the subject appears.● Change the subject of a formula where the subject appears twice.	
17.2 Algebraic fractions	<ul style="list-style-type: none">● Simplify numeric fractions and fractions containing simple algebraic terms.● Add and multiply numeric fractions.	<ul style="list-style-type: none">● Add and subtract algebraic fractions.● Multiply and divide algebraic fractions.● Change the subject of a formula involving fractions where all the variables are in the denominators.	
17.3 Simplifying algebraic fractions	<ul style="list-style-type: none">● Factorise expressions by identifying the common factor between two terms.● Simplify fractions containing simple algebraic terms.● Factorise quadratic expressions of the form $x^2 + bx + c$	<ul style="list-style-type: none">● Simplify algebraic fractions.	
17.4 More algebraic fractions	<ul style="list-style-type: none">● Simplify algebraic fractions by cancelling common factors.● Add, subtract, divide and multiply fractions containing simple algebraic terms.	<ul style="list-style-type: none">● Add and subtract more complex algebraic fractions.● Multiply and divide more complex algebraic fractions.	
17.5 Surds	<ul style="list-style-type: none">● Decide whether each number is rational or irrational.	<ul style="list-style-type: none">● Simplify expressions involving surds.● Expand expressions involving surds.● Rationalise the denominator of a fraction.	
17.6 Solving algebraic fraction equations	<ul style="list-style-type: none">● Find the lowest common multiple of two algebraic fractions.● Solve quadratic equations by factorising.● Manipulate expressions containing simple algebraic fractions.	<ul style="list-style-type: none">● Solve equations that involve algebraic fractions.	
17.7 Functions	<ul style="list-style-type: none">● Calculate the output from a function machine for three different inputs.● Solve simple equations● Write expressions using function machines	<ul style="list-style-type: none">● Use function notation.● Find composite functions.● Find inverse functions.	
17.8 Proof	<ul style="list-style-type: none">● Identify an odd number and an even number written algebraically.● Recall the definitions of equations and identities.	<ul style="list-style-type: none">● Prove a result using algebra.	

Topic 18 9 Hours

18a – Vectors and geometric proof

Sub-Topic	Previous Knowledge	New Knowledge
18.1 Vectors and vector notation	<ul style="list-style-type: none">● Use vectors to describe translations.● Recall and use Pythagoras' Theorem.● Simplify surds.	<ul style="list-style-type: none">● Understand and use vector notation.● Work out the magnitude of a vector.
18.2 Vector arithmetic	<ul style="list-style-type: none">● Understand the components of a vector and use vectors to describe translations.● Recall properties of triangles and quadrilaterals.	<ul style="list-style-type: none">● Calculate using vectors and represent the solutions graphically.● Calculate the resultant of two vectors.
18.3 More vector arithmetic	<ul style="list-style-type: none">● Use properties of a parallelogram to identify equal and parallel lines.● Add two column vectors.	<ul style="list-style-type: none">● Solve problems using vectors.● Use the resultant of two vectors to solve vector problems.
18.4 Parallel vectors and collinear points	<ul style="list-style-type: none">● Identify parallel column vectors.● Add and subtract column vectors.	<ul style="list-style-type: none">● Express points as position vectors.● Prove lines are parallel.● Prove points are collinear.
18.5 Solving geometric problems	<ul style="list-style-type: none">● Understand the relationship between ratio and fractional parts● Identify parallel vectors	<ul style="list-style-type: none">● Solve geometric problems in two dimensions using vector methods.● Apply vector methods for simple geometric proofs.

Topic 19 7 Hours

19a - Reciprocal and exponential graphs; Gradient and area under graphs

19b - Direct and inverse proportion

Sub-Topic	Previous Knowledge	New Knowledge
19.1 Direct proportion	<ul style="list-style-type: none">● Recognise direct proportion● Write equations for quantities in direct proportion.	<ul style="list-style-type: none">● Write and use equations to solve problems involving direct proportion.
19.2 More direct proportion	<ul style="list-style-type: none">● Use direct proportion.● Find the constant of proportionality.	<ul style="list-style-type: none">● Write and use equations to solve problems involving direct proportion.● Solve problems involving square and cubic proportionality.
19.3 Inverse proportion	<ul style="list-style-type: none">● Using inverse proportion to solve simple problems.● Write equations for quantities in direct proportion.	<ul style="list-style-type: none">● Write and use equations to solve problems involving inverse proportion.● Use and recognise graphs showing inverse proportion.
19.4 Exponential functions	<ul style="list-style-type: none">● Evaluate indices	<ul style="list-style-type: none">● Recognise graphs of exponential functions.● Sketch graphs of exponential functions.
19.5 Non-linear graphs	<ul style="list-style-type: none">● Work out the area of a trapezium● Recall and use the formula $\text{speed} = \text{distance} \div \text{time}$.● Find the gradient of a line between two given points.	<ul style="list-style-type: none">● Calculate the gradient of a tangent at a point.● Estimate the area under a non-linear graph.
19.6 Translating graphs of functions	<ul style="list-style-type: none">● Translating coordinates● Function notation	<ul style="list-style-type: none">● Understand the relationship between translating a graph and the change in its function notation.
19.7 Reflecting and stretching graphs of functions	<ul style="list-style-type: none">● Transformation of functions	<ul style="list-style-type: none">● Understand the effect stretching a curve parallel to one of the axes has on its function form.● Understand the effect reflecting a curve in one of the axes has on its function form.