

	Term	Topic	Learning Outcomes	Assessment
Year 9	Spring 2	Unit 6: Angles - Parallel Lines	<ul style="list-style-type: none"> <li>Estimate sizes of angles;</li> <li>Measure angles using a protractor;</li> <li>Use geometric language appropriately;</li> <li>Use letters to identify points, lines and angles;</li> <li>Use two-letter notation for a line and three-letter notation for an angle;</li> <li>Describe angles as turns and in degrees and understand clockwise and anticlockwise;</li> <li>Know that there are <math>360^\circ</math> in a full turn, <math>180^\circ</math> in a half turn and <math>90^\circ</math> in a quarter turn;</li> <li>Identify a line perpendicular to a given line on a diagram and use their properties;</li> <li>Identify parallel lines on a diagram and use their properties;</li> <li>Find missing angles using properties of corresponding and alternate angles;</li> <li>Understand and use the angle properties of parallel lines.</li> <li>Recall the properties and definitions of special types of quadrilaterals, including symmetry properties;</li> <li>List the properties of each special type of quadrilateral, or identify (name) a given shape;</li> <li>Draw sketches of shapes;</li> <li>Classify quadrilaterals by their geometric properties and name all quadrilaterals that have a specific property;</li> <li>Identify quadrilaterals from everyday usage;</li> <li>Given some information about a shape on coordinate axes, complete the shape; Understand and use the angle properties of quadrilaterals;</li> <li>Use the fact that angle sum of a quadrilateral is <math>360^\circ</math>;</li> <li>Recall and use properties of angles at a point, angles at a point on a straight line, right angles, and vertically opposite angles;</li> <li>Distinguish between scalene, equilateral, isosceles and right-angled triangles;</li> <li>Derive and use the sum of angles in a triangle;</li> <li>Find a missing angle in a triangle, using the angle sum of a triangle is <math>180^\circ</math>;</li> <li>Understand and use the angle properties of triangles, use the symmetry property of isosceles triangle to show that base angles are equal;</li> <li>Use the side/angle properties of isosceles and equilateral triangles;</li> <li>Understand and use the angle properties of intersecting lines;</li> <li>Understand a proof that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices; Use geometrical language appropriately</li> </ul>	

		<p>Unit 6: Polygons</p>	<ul style="list-style-type: none"> <li>• Recognise and name pentagons, hexagons, heptagons, octagons and decagons;</li> <li>• Understand 'regular' and 'irregular' as applied to polygons;</li> <li>• Use the sum of angles of irregular polygons;</li> <li>• Calculate and use the sums of the interior angles of polygons;</li> <li>• Calculate and use the angles of regular polygons;</li> <li>• Use the sum of the interior angles of an <math>n</math>-sided polygon;</li> <li>• Use the sum of the exterior angles of any polygon is <math>360^\circ</math>;</li> <li>• Use the sum of the interior angle and the exterior angle is <math>180^\circ</math>;</li> <li>• Identify shapes which are congruent (by eye);</li> <li>• Explain why some polygons fit together and others do not;</li> </ul>	<p>End of Unit Test</p>
<p>Summer 1</p>		<p>Unit 7: Statistics - Averages</p>	<ul style="list-style-type: none"> <li>• Specify the problem and:             <ul style="list-style-type: none"> <li>• plan an investigation;</li> <li>• decide what data to collect and what statistical analysis is needed;</li> <li>• consider fairness;</li> </ul> </li> <li>• Recognise types of data: primary secondary, quantitative and qualitative;</li> <li>• Identify which primary data they need to collect and in what format, including grouped data;</li> <li>• Collect data from a variety of suitable primary and secondary sources;</li> <li>• Understand how sources of data may be biased and explain why a sample may not be representative of a whole population;</li> <li>• Understand sample and population.</li> <li>• Calculate the mean, mode, median and range for discrete data;</li> <li>• Interpret and find a range of averages as follows:</li> </ul>	<p>End of Unit Test</p>

			<ul style="list-style-type: none"> <li>• median, mean and range from a (discrete) frequency table;</li> <li>• range, modal class, interval containing the median, and estimate of the mean from a grouped data frequency table;</li> <li>• mode and range from a bar chart;</li> <li>• median, mode and range from stem and leaf diagrams;</li> <li>• mean from a bar chart;</li> <li>• Understand that the expression 'estimate' will be used where appropriate, when finding the mean of grouped data using mid-interval values;</li> <li>• Compare the mean, median, mode and range (as appropriate) of two distributions using bar charts, dual bar charts, pictograms and back-to-back stem and leaf;             <ul style="list-style-type: none"> <li>• Recognise the advantages and disadvantages between measures of average.</li> </ul> </li> </ul>	
	<p>Summer 2</p>	<p>Unit 8: Perimeter, Area and Volume</p>	<ul style="list-style-type: none"> <li>• Indicate given values on a scale, including decimal value;</li> <li>• Know that measurements using real numbers depend upon the choice of unit;</li> <li>• Convert between units of measure within one system, including time and metric units to metric units of length, area and volume and capacity e.g. <math>1\text{ml} = 1\text{cm}^3</math>;</li> <li>• Make sensible estimates of a range of measures in everyday settings;</li> <li>• Measure shapes to find perimeters and areas using a range of scales;</li> <li>• Find the perimeter of             <ul style="list-style-type: none"> <li>• rectangles and triangles;</li> <li>• parallelograms and trapezia;</li> <li>• compound shapes;</li> </ul> </li> <li>• Recall and use the formulae for the area of a triangle and rectangle;</li> <li>• Find the area of a trapezium and recall the formula;</li> <li>• Find the area of a parallelogram;</li> </ul>	<p>End of Unit Test</p>

			<ul style="list-style-type: none"> <li>• Calculate areas and perimeters of compound shapes made from triangles and rectangles;</li> <li>• Estimate surface areas by rounding measurements to 1 significant figure;</li> <li>• Find the surface area of a prism;</li> <li>• Find surface area using rectangles and triangles;</li> <li>• Identify and name common solids: cube, cuboid, cylinder, prism, pyramid, sphere and cone;</li> <li>• Sketch nets of cuboids and prisms;</li> <li>• Recall and use the formula for the volume of a cuboid;</li> <li>• Find the volume of a prism, including a triangular prism, cube and cuboid;</li> <li>• Calculate volumes of right prisms and shapes made from cubes and cuboids;             <ul style="list-style-type: none"> <li>• Estimate volumes etc by rounding measurements to 1 significant figure</li> </ul> </li> </ul>	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Year 10</p>	<p>Autumn1</p>	<p>Unit 6: Angles - Parallel Lines</p>	<ul style="list-style-type: none"> <li>• Estimate sizes of angles;</li> <li>• Measure angles using a protractor;</li> <li>• Use geometric language appropriately;</li> <li>• Use letters to identify points, lines and angles;</li> <li>• Use two-letter notation for a line and three-letter notation for an angle;</li> <li>• Describe angles as turns and in degrees and understand clockwise and anticlockwise;</li> <li>• Know that there are <math>360^\circ</math> in a full turn, <math>180^\circ</math> in a half turn and <math>90^\circ</math> in a quarter turn;</li> <li>• Identify a line perpendicular to a given line on a diagram and use their properties;</li> <li>• Identify parallel lines on a diagram and use their properties;</li> <li>• Find missing angles using properties of corresponding and alternate angles;</li> <li>• Understand and use the angle properties of parallel lines.</li> <li>• Recall the properties and definitions of special types of quadrilaterals, including symmetry properties;</li> <li>• List the properties of each special type of quadrilateral, or identify (name) a given shape;</li> <li>• Draw sketches of shapes;</li> <li>• Classify quadrilaterals by their geometric properties and name all quadrilaterals that have a specific property;</li> <li>• Identify quadrilaterals from everyday usage;</li> </ul>	

		<ul style="list-style-type: none"> <li>Given some information about a shape on coordinate axes, complete the shape; Understand and use the angle properties of quadrilaterals;</li> <li>Use the fact that angle sum of a quadrilateral is <math>360^\circ</math>;</li> <li>Recall and use properties of angles at a point, angles at a point on a straight line, right angles, and vertically opposite angles;</li> <li>Distinguish between scalene, equilateral, isosceles and right-angled triangles;</li> <li>Derive and use the sum of angles in a triangle;</li> <li>Find a missing angle in a triangle, using the angle sum of a triangle is <math>180^\circ</math>;</li> <li>Understand and use the angle properties of triangles, use the symmetry property of isosceles triangle to show that base angles are equal;</li> <li>Use the side/angle properties of isosceles and equilateral triangles;</li> <li>Understand and use the angle properties of intersecting lines;</li> <li>Understand a proof that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices; Use geometrical language appropriately</li> </ul>	
	<p>Unit 6: Polygons</p>	<ul style="list-style-type: none"> <li>Recognise and name pentagons, hexagons, heptagons, octagons and decagons;</li> <li>Understand 'regular' and 'irregular' as applied to polygons;</li> <li>Use the sum of angles of irregular polygons;</li> <li>Calculate and use the sums of the interior angles of polygons;</li> <li>Calculate and use the angles of regular polygons;</li> <li>Use the sum of the interior angles of an <math>n</math>-sided polygon;</li> <li>Use the sum of the exterior angles of any polygon is <math>360^\circ</math>;</li> <li>Use the sum of the interior angle and the exterior angle is <math>180^\circ</math>;</li> <li>Identify shapes which are congruent (by eye);</li> <li>Explain why some polygons fit together and others do not;</li> </ul>	<p>End of Unit Test</p>

Unit 7: Statistics - Averages

- Specify the problem and:
  - plan an investigation;
  - decide what data to collect and what statistical analysis is needed;
  - consider fairness;
- Recognise types of data: primary secondary, quantitative and qualitative;
- Identify which primary data they need to collect and in what format, including grouped data;
- Collect data from a variety of suitable primary and secondary sources;
- Understand how sources of data may be biased and explain why a sample may not be representative of a whole population;
- Understand sample and population.
- Calculate the mean, mode, median and range for discrete data;
- Interpret and find a range of averages as follows:
  - median, mean and range from a (discrete) frequency table;
  - range, modal class, interval containing the median, and estimate of the mean from a grouped data frequency table;
  - mode and range from a bar chart;
  - median, mode and range from stem and leaf diagrams;
  - mean from a bar chart;
- Understand that the expression 'estimate' will be used where appropriate, when finding the mean of grouped data using mid-interval values;
- Compare the mean, median, mode and range (as appropriate) of two distributions using bar charts, dual bar charts, pictograms and back-to-back stem and leaf;
  - Recognise the advantages and disadvantages between measures of average.

End of Unit Test

Autumn 2

Unit 8: Perimeter, Area and  
Volume

- Indicate given values on a scale, including decimal value;
- Know that measurements using real numbers depend upon the choice of unit;
- Convert between units of measure within one system, including time and metric units to metric units of length, area and volume and capacity e.g.  $1\text{ml} = 1\text{cm}^3$ ;
- Make sensible estimates of a range of measures in everyday settings;
- Measure shapes to find perimeters and areas using a range of scales;
- Find the perimeter of
  - rectangles and triangles;
  - parallelograms and trapezia;
  - compound shapes;
- Recall and use the formulae for the area of a triangle and rectangle;
- Find the area of a trapezium and recall the formula;
- Find the area of a parallelogram;
- Calculate areas and perimeters of compound shapes made from triangles and rectangles;
- Estimate surface areas by rounding measurements to 1 significant figure;
- Find the surface area of a prism;
- Find surface area using rectangles and triangles;
- Identify and name common solids: cube, cuboid, cylinder, prism, pyramid, sphere and cone;
- Sketch nets of cuboids and prisms;
- Recall and use the formula for the volume of a cuboid;
- Find the volume of a prism, including a triangular prism, cube and cuboid;
- Calculate volumes of right prisms and shapes made from cubes and cuboids;
  - Estimate volumes etc by rounding measurements to 1 significant figure

End of Unit Test

Year 10	Unit 9: Real Life Graphs	<ul style="list-style-type: none"> <li>• Use input/output diagrams;</li> <li>• Draw, label and scale axes;</li> <li>• Use axes and coordinates to specify points in all four quadrants in 2D;</li> <li>• Identify points with given coordinates and coordinates of a given point in all four quadrants;</li> <li>• Find the coordinates of points identified by geometrical information in 2D (all four quadrants);</li> <li>• Find the coordinates of the midpoint of a line segment;</li> <li>• Read values from straight-line graphs for real-life situations;</li> <li>• Draw straight line graphs for real-life situations, including ready reckoner graphs, conversion graphs, fuel bills graphs, fixed charge and cost per unit;</li> <li>• Draw distance–time graphs and velocity–time graphs;</li> <li>• Work out time intervals for graph scales;</li> <li>• Interpret distance–time graphs, and calculate: the speed of individual sections, total distance and total time;</li> <li>• Interpret information presented in a range of linear and non-linear graphs;</li> <li>• Interpret graphs with negative values on axes;</li> </ul> <p>Interpret gradient as the rate of change in distance–time and speed–time graphs, graphs of containers filling and emptying, and unit price graphs.</p>	
---------	--------------------------	--	--

	Term	Topic	Learning Outcomes	Assessment
Year 10		Unit 9: Linear Graphs	<ul style="list-style-type: none"> <li>• Use function machines to find coordinates (i.e. given the input <math>x</math>, find the output <math>y</math>);</li> <li>• Plot and draw graphs of <math>y = a</math>, <math>x = a</math>, <math>y = x</math> and <math>y = -x</math>;</li> <li>• Recognise straight-line graphs parallel to the axes;</li> </ul>	End of Unit Test



Spring  
1

Unit 10: Transformations

- Recognise that equations of the form  $y = mx + c$  correspond to straight-line graphs in the coordinate plane;
- Plot and draw graphs of straight lines of the form  $y = mx + c$  using a table of values;
- Sketch a graph of a linear function, using the gradient and  $y$ -intercept;
- Identify and interpret gradient from an equation  $y = mx + c$ ;
- Identify parallel lines from their equations;
- Plot and draw graphs of straight lines in the form  $ax + by = c$ ;
- Find the equation of a straight line from a graph;
- Find the equation of the line through one point with a given gradient;
- Find approximate solutions to a linear equation from a graph;
- Find the gradient of a straight line from real-life graphs too.
- Identify congruent shapes by eye;
- Understand that rotations are specified by a centre, an angle and a direction of rotation;
- Find the centre of rotation, angle and direction of rotation and describe rotations fully using the angle, direction of turn, and centre;
- Rotate and draw the position of a shape after rotation about the origin or any other point including rotations on a coordinate grid;
- Identify correct rotations from a choice of diagrams;
- Understand that translations are specified by a distance and direction using a vector;
- Translate a given shape by a vector;
- Use column vectors to describe and transform 2D shapes using single translations on a coordinate grid;
- Understand that distances and angles are preserved under rotations and translations, so that any figure is congruent under either of these transformations;
- Understand that reflections are specified by a mirror line;
- Identify correct reflections from a choice of diagrams;
- Identify the equation of a line of symmetry;

End of Unit Test

- Transform 2D shapes using single reflections (including those not on coordinate grids) with vertical, horizontal and diagonal mirror lines;
- Describe reflections on a coordinate grid;
- Scale a shape on a grid (without a centre specified);
- Understand that an enlargement is specified by a centre and a scale factor;
- Enlarge a given shape using (0, 0) as the centre of enlargement, and enlarge shapes with a centre other than (0, 0);
- Find the centre of enlargement by drawing;
- Describe and transform 2D shapes using enlargements by:
  - a positive integer & fractional scale factor;
- Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides, simple integer scale factors, or simple fractions;
- Understand that distances and angles are preserved under reflections, so that any figure is congruent under this transformation;
- Understand that similar shapes are enlargements of each other and angles are preserved – define similar in this unit;
- Describe and transform 2D shapes using combined rotations, reflections, translations, or enlargements.

### Unit 11: Ratio

- Understand and express the division of a quantity into a of number parts as a ratio;
- Write ratios in their simplest form;
- Write/interpret a ratio to describe a situation;
- Share a quantity in a given ratio including three-part ratios;
- Solve a ratio problem in context:
  - use a ratio to find one quantity when the other is known;
  - use a ratio to compare a scale model to a real-life object;
  - use a ratio to convert between measures and currencies;
- problems involving mixing, e.g. paint colours, cement and drawn conclusions;
- Compare ratios;
- Write ratios in form  $1 : m$  or  $m : 1$ ;
- Write a ratio as a fraction;

- Write a ratio as a linear function;
- Write lengths, areas and volumes of two shapes as ratios in simplest form;
- Express a multiplicative relationship between two quantities as a ratio or a fraction.

	Term	Topic	Learning Outcomes	Assessment
Year 10		Unit 11: Proportion	<ul style="list-style-type: none"> <li>• Understand and use proportion as equality of ratios;</li> <li>• Solve word problems involving direct and indirect proportion;</li> <li>• Work out which product is the better buy;</li> <li>• Scale up recipes;</li> <li>• Convert between currencies;</li> <li>• Find amounts for 3 people when amount for 1 given;</li> <li>• Solve proportion problems using the unitary method;</li> <li>• Recognise when values are in direct proportion by reference to the graph form;</li> <li>• Understand inverse proportion: as <math>x</math> increases, <math>y</math> decreases (inverse graphs done in later unit);</li> <li>• Recognise when values are in direct proportion by reference to the graph form;</li> <li>• Understand direct proportion ---&gt; relationship <math>y = kx</math>.</li> </ul>	End of Unit Test
	Summer 1	Unit 12: Pythagoras and Trigonometry	<ul style="list-style-type: none"> <li>• Understand, recall and use Pythagoras' Theorem in 2D, including leaving answers in surd form and being able to justify if a triangle is right-angled or not;</li> <li>• Calculate the length of the hypotenuse and of a shorter side in a right-angled triangle, including decimal lengths and a range of units;</li> <li>• Apply Pythagoras' Theorem with a triangle drawn on a coordinate grid;</li> <li>• Calculate the length of a line segment AB given pairs of points;</li> </ul>	End of Unit Test

			<ul style="list-style-type: none"> <li>• Understand, use and recall the trigonometric ratios sine, cosine and tan, and apply them to find angles and lengths in general triangles in 2D figures;</li> <li>• Use the trigonometric ratios to solve 2D problems including angles of elevation and depression;</li> <li>• Round answers to appropriate degree of accuracy, either to a given number of significant figures or decimal places, or make a sensible decision on rounding in context of question;</li> <li>• Know the exact values of <math>\sin \theta</math> and <math>\cos \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math>; know the exact value of <math>\tan \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math>.</li> </ul>	
	<p>Summer 2</p>	<p>Unit 13: Probability</p>	<ul style="list-style-type: none"> <li>• Distinguish between events which are impossible, unlikely, even chance, likely, and certain to occur;</li> <li>• Mark events and/or probabilities on a probability scale of 0 to 1;</li> <li>• Write probabilities in words or fractions, decimals and percentages;</li> <li>• Find the probability of an event happening using theoretical probability;</li> <li>• Use theoretical models to include outcomes using dice, spinners, coins;</li> <li>• List all outcomes for single events systematically;</li> <li>• Work out probabilities from frequency tables, frequency trees, and two way tables;</li> <li>• Record outcomes of probability experiments in tables;</li> <li>• Add simple probabilities;</li> <li>• Identify different mutually exclusive outcomes and know that the sum of the probabilities of all outcomes is 1;</li> <li>• Using <math>1 - p</math> as the probability of an event not occurring where <math>p</math> is the probability of the event occurring;</li> <li>• Find a missing probability from a list or table including algebraic terms;</li> <li>• Find the probability of an event happening using relative frequency;</li> <li>• Estimate the number of times an event will occur, given the probability and the number of trials – for both experimental and theoretical probabilities;</li> <li>• List all outcomes for combined events systematically;</li> </ul>	

- Use and draw sample space diagrams;
- Work out probabilities from Venn diagrams to represent real-life situations and also 'abstract' sets of numbers/values;
- Use union and intersection notation;
- Compare experimental data and theoretical probabilities;
- Compare relative frequencies from samples of different sizes;
- Find the probability of successive events, such as several throws of a single dice;
- Use tree diagrams to calculate the probability of two independent events;
- Use tree diagrams to calculate the probability of two dependent events

**End of year assessment**

**This will include all topics covered**

**Misconceptions will be addressed as part of the end of year assessment review process**

	Term	Topic	Learning Outcomes	Assessment
Year 11	Autumn 1	Unit 14: Multiplicative Reasoning	<ul style="list-style-type: none"> <li>Understand and use compound measures:               <ul style="list-style-type: none"> <li>density;</li> <li>pressure;</li> <li>speed;</li> </ul> </li> <li>convert between metric speed measures;</li> <li>read values in km/h and mph from a speedometer;</li> <li>calculate average speed, distance, time – in miles per hour as well as metric measures;</li> <li>use kinematics formulae from the formulae sheet to calculate speed, acceleration (with variables defined in the question);</li> <li>change d/t in m/s to a formula in km/h, i.e. <math>d/t \times (60 \times 60)/1000</math> – with support;</li> <li>Express a given number as a percentage of another number in more complex situations;</li> <li>Calculate percentage profit or loss;</li> <li>Make calculations involving repeated percentage change, not using the formula;</li> <li>Find the original amount given the final amount after a percentage increase or decrease;</li> <li>Use compound interest;</li> <li>Use a variety of measures in ratio and proportion problems:               <ul style="list-style-type: none"> <li>currency conversion;</li> <li>rates of pay;</li> <li>best value;</li> </ul> </li> <li>Set up, solve and interpret the answers in growth and decay problems;</li> <li>Understand that <math>X</math> is inversely proportional to <math>Y</math> is equivalent to <math>X</math> is proportional to <math>\frac{1}{Y}</math></li> <li>Interpret equations that describe direct and inverse proportion.</li> </ul>	

Unit 15: Plans and Elevations

- Understand clockwise and anticlockwise;
- Draw circles and arcs to a given radius or given the diameter;
- Measure and draw lines, to the nearest mm;
- Measure and draw angles, to the nearest degree;
- Know and use compass directions;
- Draw sketches of 3D solids;
- Know the terms face, edge and vertex;
- Identify and sketch planes of symmetry of 3D solids;
- Use isometric grids to draw 2D representations of 3D solids;
- Make accurate drawings of triangles and other 2D shapes using a ruler and a protractor;
- Construct diagrams of everyday 2D situations involving rectangles, triangles, perpendicular and parallel lines;
- Understand and draw front and side elevations and plans of shapes made from simple solids;
- Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid.

Unit 15: Constructions, Loci and Bearings

- Understand congruence, as two shapes that are the same size and shape;
- Visually identify shapes which are congruent;
- Use straight edge and a pair of compasses to do standard constructions:
- understand, from the experience of constructing them, that triangles satisfying SSS, SAS, ASA and RHS are unique, but SSA triangles are not;
- construct the perpendicular bisector of a given line;
- construct the perpendicular from a point to a line;
- construct the bisector of a given angle;
- construct angles of  $90^\circ$ ,  $45^\circ$ ;
- Draw and construct diagrams from given instructions, including the following:
- a region bounded by a circle and an intersecting line;

Mock Exams

- a given distance from a point and a given distance from a line;
- equal distances from two points or two line segments;
- regions may be defined by 'nearer to' or 'greater than';
- Find and describe regions satisfying a combination of loci;
- Use constructions to solve loci problems (2D only);
- Use and interpret maps and scale drawings;
- Estimate lengths using a scale diagram;
- Make an accurate scale drawing from a diagram;
- Use three-figure bearings to specify direction;
- Mark on a diagram the position of point  $B$  given its bearing from point  $A$ ;
- Give a bearing between the points on a map or scaled plan;
- Given the bearing of a point  $A$  from point  $B$ , work out the bearing of  $B$  from  $A$ ;
- Use accurate drawing to solve bearings problems;
- Solve locus problems including bearings.



	Term	Topic	Learning Outcomes	Assessment
Year 11	Autumn 2	Unit 16: Quadratic Equations	<ul style="list-style-type: none"> <li>Define a 'quadratic' expression;</li> <li>Multiply together two algebraic expressions with brackets;</li> <li>Square a linear expression, e.g. <math>(x + 1)^2</math>;</li> <li>Factorise quadratic expressions of the form <math>x^2 + bx + c</math>;</li> <li>Factorise a quadratic expression <math>x^2 - a^2</math> using the difference of two squares;</li> <li>Solve quadratic equations by factorising;</li> <li>Find the roots of a quadratic function algebraically</li> </ul>	
		Unit 16: Quadratic Graphs	<ul style="list-style-type: none"> <li>Generate points and plot graphs of simple quadratic functions, then more general quadratic functions;</li> <li>Identify the line of symmetry of a quadratic graph;</li> <li>Find approximate solutions to quadratic equations using a graph;</li> <li>Interpret graphs of quadratic functions from real-life problems;</li> <li>Identify and interpret roots, intercepts and turning points of quadratic graphs</li> </ul>	
	Spring 1	Unit 17: Advanced Measures	<ul style="list-style-type: none"> <li>Recall the definition of a circle and identify, name and draw parts of a circle including tangent, chord and segment;</li> <li>Recall and use formulae for the circumference of a circle and the area enclosed by a circle circumference of a circle = <math>2\pi r = \pi d</math>, area of a circle = <math>\pi r^2</math>;</li> <li>Use <math>\pi \approx 3.142</math> or use the <math>\pi</math> button on a calculator;</li> <li>Give an answer to a question involving the circumference or area of a circle in terms of <math>\pi</math>;</li> <li>Find radius or diameter, given area or perimeter of a circles;</li> <li>Find the perimeters and areas of semicircles and quarter-circles;</li> </ul>	

		<ul style="list-style-type: none"> <li>• Calculate perimeters and areas of composite shapes made from circles and parts of circles;</li> <li>• Calculate arc lengths, angles and areas of sectors of circles;</li> <li>• Find the surface area and volume of a cylinder;</li> <li>• Find the surface area and volume of spheres, pyramids, cones and composite solids;</li> <li>• Round answers to a given degree of accuracy.</li> </ul>	
	Unit 18: Advanced Number	<ul style="list-style-type: none"> <li>• Add and subtract mixed number fractions;</li> <li>• Multiply mixed number fractions;</li> <li>• Divide mixed numbers by whole numbers and vice versa;</li> <li>• Find the reciprocal of an integer, decimal or fraction;</li> <li>• Understand 'reciprocal' as multiplicative inverse, knowing that any non-zero number multiplied by its reciprocal is 1 (and that zero has no reciprocal because division by zero is not defined).</li> <li>• Use index laws to simplify and calculate the value of numerical expressions involving multiplication and division of integer powers, fractions and powers of a power;</li> <li>• Use numbers raised to the power zero, including the zero power of 10;</li> <li>• Convert large and small numbers into standard form and vice versa;</li> <li>• Add, subtract, multiply and divide numbers in standard form;</li> <li>• Interpret a calculator display using standard form and know how to enter numbers in standard form.</li> </ul>	Mock Exam
Spring 2	Unit 19: Congruence and Similarity	<ul style="list-style-type: none"> <li>• Use the basic congruence criteria for triangles (SSS, SAS, ASA and RHS);</li> <li>• Solve angle problems involving congruence;</li> <li>• Identify shapes which are similar; including all circles or all regular polygons with equal number of sides;</li> </ul>	

- Understand similarity of triangles and of other plane shapes, use this to make geometric inferences, and solve angle problems using similarity;
- Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides;
- Understand the effect of enlargement on perimeter of shapes;
- Solve problems to find missing lengths in similar shapes;
- Know that scale diagrams, including bearings and maps are 'similar' to the real-life examples.

	Term	Topic	Learning Outcomes	Assessment
Year 11		Unit 19: Vectors	<ul style="list-style-type: none"> <li>• Understand and use column notation in relation to vectors;</li> <li>• Be able to represent information graphically given column vectors;</li> <li>• Identify two column vectors which are parallel;</li> <li>• Calculate using column vectors, and represent graphically, the sum of two vectors, the difference of two vectors and a scalar multiple of a vector.</li> </ul>	
		Unit 20: Rearranging equations, graphs of cubic and reciprocal functions and simultaneous equations	<ul style="list-style-type: none"> <li>• Know the difference between an equation and an identity and use and understand the <math>\neq</math> symbol;</li> <li>• Change the subject of a formula involving the use of square roots and squares;</li> <li>• Answer 'show that' questions using consecutive integers <math>(n, n + 1)</math>, squares <math>a^2, b^2</math>, even numbers <math>2n</math>, and odd numbers <math>2n + 1</math>;</li> <li>• Solve problems involving inverse proportion using graphs, and read values from graphs;</li> <li>• Find the equation of the line through two given points;</li> <li>• Recognise, sketch and interpret graphs of simple cubic functions;</li> </ul>	

- Recognise, sketch and interpret graphs of the reciprocal function  $y = \frac{1}{x}$  with  $x \neq 0$ ;
- Use graphical representations of indirect proportion to solve problems in context;
- identify and interpret the gradient from an equation  $ax + by = c$ ;
- Write simultaneous equations to represent a situation;
- Solve simultaneous equations (linear/linear) algebraically and graphically;
- Solve simultaneous equations representing a real-life situation, graphically and algebraically, and interpret the solution in the context of the problem;

### Exam dates:

**Paper 1: 19<sup>th</sup> May 2023**

**Paper 2: 7<sup>th</sup> June 2023**

**Paper 3: 14<sup>th</sup> June 2023**