
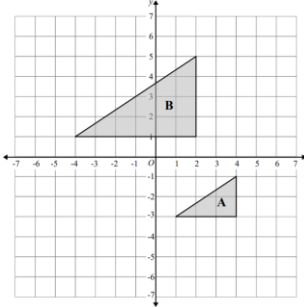
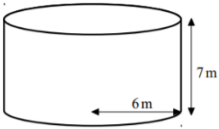
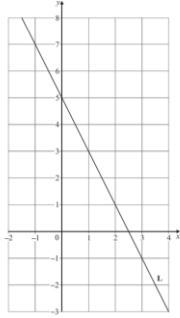
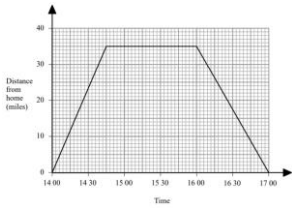
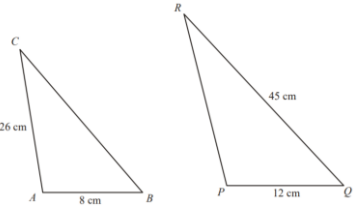
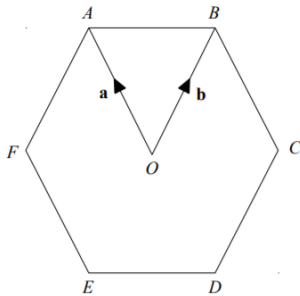


Curriculum Map: Mathematics Year 11 Foundation Tier

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Content</p> <p>Declarative knowledge</p> <p>‘I Know’</p>	<p>Sequences</p> <p>Generate terms of a sequence</p> <p>nth term of a linear sequence</p> <p>Special sequences</p> <p>Compound units</p> <p>Speed</p> <p>Density</p> <p>Equations and Inequalities</p> <p>Linear equations in one unknown</p> <p>Inequalities in one variable</p>	<p>Direct and Inverse Proportion</p> <p>Equivalent ratios</p> <p>Division in a given ratio</p> <p>Ratios and fractions</p> <p>Direct proportion</p> <p>Inverse proportion</p> <p>Graphs</p> <p>Straight line Graphs</p> <p>Areas</p> <p>Gradients</p> <p>Graphs of real-world contexts</p>	<p>Transformations</p> <p>Reflection</p> <p>Rotation</p> <p>Translation</p> <p>Similar Figures</p> <p>Congruent triangles</p> <p>Similar triangles</p> <p>Enlargement</p> <p>Similar shapes</p> <p>Volumes and surface area calculations</p>	<p>Functions and Graphs</p> <p>Functions</p> <p>Polynomial functions</p> <p>Graphs of equations and functions</p> <p>Vectors</p> <p>Vector arithmetic</p> <p>Column vectors</p>	<p>Exact Calculations</p> <p>Exact calculations</p> <p>Calculations and estimations of powers and roots</p> <p>Exact trigonometric values</p>	Public exams
<p>Skills</p> <p>Procedural Knowledge</p> <p>‘I know how to’</p>	<p>Sequences</p> <p>Generate a sequence by spotting a pattern or using a term-to-term rule given algebraically or in words.</p> <p>Find a position-to-term rule for simple arithmetic sequences algebraically and describe more complex sequences in words.</p> <p>Find the nth term of a linear sequence.</p> <p>Recognise sequences of triangular, square and cube numbers, and simple arithmetic progressions.</p> <p>Recognise sequences presented</p>	<p>Direct and Inverse Proportion</p> <p>Find the ratio of quantities in the form $a : b$ and simplify.</p> <p>Find the ratio of quantities where the parts are given in different units.</p> <p>Find the ratio of quantities in the form $1 : n$.</p> <p>Given the ratio of the parts, split a quantity into two parts.</p> <p>Express as a ratio the division of a quantity into two parts.</p> <p>Given the ratio of the two quantities, calculate one quantity from another.</p> <p>Interpret a ratio of two parts as fractions of a whole.</p> <p>Solve problems involving quantities in direct proportion</p>	<p>Transformations</p> <p>Identify lines of symmetry in triangles, quadrilaterals and other polygons.</p> <p>Reflect a simple shape in a given vertical, horizontal or 45° diagonal mirror line.</p> <p>Identify a mirror line from a simple shape and its image under reflection. Use the co-ordinate grid.</p> <p>Identify rotational symmetry in triangles, quadrilaterals and other polygons.</p> <p>Rotate a simple shape clockwise or anticlockwise through a multiple of 90 degrees about a given centre of rotation.</p> <p>Identify the centre, angle and sense of a rotation from a simple shape and its image under rotation.</p> <p>Use a column vector to describe a translation of a simple shape.</p>	<p>Functions and Graphs</p> <p>Identify intercepts of graphs of quadratic functions.</p> <p>Use symmetry to identify the turning point of a graph of a quadratic function.</p> <p>Find algebraically the roots of a quadratic equation.</p> <p>Sketch graphs of quadratic functions, identifying the turning point by symmetry.</p> <p>Recognise and sketch graphs of simple polynomial and reciprocal graphs.</p> <p>Interpret, where appropriate, simple expressions as functions with inputs and outputs.</p> <p>Review the four operations and BIDMAS in the context of function machines.</p>	<p>Exact Calculations</p> <p>Use fractional multiples in exact calculations without a calculator.</p> <p>Recap Mensuration formulae.</p> <p>Use multiples of π in exact calculations without a calculator.</p> <p>Recap Circumference, Area and Volume formulae</p> <p>Use square roots in calculations with a calculator.</p>	

<p>diagrammatically and tabulate results.</p> <p>Compound units Use and convert simple compound units (e.g. for speed, rates of pay and unit pricing). Know and apply standard compound measurement formulae: speed = distance ÷ time, density = mass ÷ volume</p> <p>Equations and Inequalities Recap linear equations including those with the unknown on both sides of the equation.</p> <p>Recap linear equations including those with brackets and the unknown on both sides of the equation.</p> <p>Understand and use the symbols $<$, $>$, \geq, \leq and $=$.</p> <p>Represent inequalities on a number line using the conventional notation of solid or open dots.</p> <p>Solve linear inequalities in one variable, representing solutions on a number line using the conventional notation.</p>	<p>and recognise a proportionality constant. Use a proportionality symbol and constant. Recognise that if $y = kx$, where k is a constant, then y is proportional to x.</p> <p>Solve simple word problems involving quantities in inverse proportion or simple algebraic proportions.</p> <p>Solve problems involving quantities in inverse proportion and recognise a proportionality constant. Use a proportionality symbol and constant. Recognise that if $y = k/x$, where k is a constant, then y is inversely proportional to x.</p> <p>Graphs Review $y = mx + c$. Find the gradient and y-intercept from a straight line graph. Find $y = mx + c$ from one point and the gradient and from two points.</p> <p>Revision of areas of rectilinear shapes. Find area of shape defined by lines on graph. Find distance between points on a graph. Use Pythagoras' Theorem to find perimeter of shape defined by lines on graph.</p> <p>Find the gradient for conversion charts and link gradient with ratio and proportionality. Interpret straight line gradients as rates of change including velocity as the gradient of a displacement-time graph. Construct and interpret graphs in real-world contexts.</p>	<p>Perform a specified translation given as a column vector.</p> <p>Similar Figures Prove that two triangles are congruent using the cases: 3 sides (SSS), 2 angles and the included side (ASA), 2 sides and the included angle (SAS) and right angle, hypotenuse, side (RHS). Apply congruent triangles in calculations and simple proofs</p> <p>Identify similar triangles. Prove that two triangles are similar. Use similarity and ratios to determine missing sides or scale factors. Enlarge a simple shape from a given centre using a positive integer scale factor.</p> <p>Use x- and y- coordinates in plane geometry problems, including transformations.</p> <p>Identify the centre and positive integer scale factor of an enlargement of a simple shape and perform such an enlargement on a simple shape. Enlarge a simple shape from a given centre using a positive fractional scale factor.</p> <p>Identify the centre and scale factor (including fractional scale factors) of an enlargement of a simple shape and perform such an enlargement on a simple shape.</p> <p>Apply similarity to calculate unknown lengths in similar figures.</p> <p>Review of Volume and Surface Area formulae. Compare lengths, areas and volumes using ratio notation and scale factors Calculate missing lengths, area or volumes of similar shapes or solids.</p>	<p>Interpret the result of applying successive functions on an initial input to find the final output as a review of BIDMAS.</p> <p>Define sequences as a set of function machine operations and interpret given function machines to generate sequences.</p> <p>Use tables of values to plot graphs of linear and quadratic functions.</p> <p>Use tables of values to plot polynomial graphs.</p> <p>Use a table of values to plot complex reciprocal graphs.</p> <p>Use a table of values to plot other polynomial graphs.</p> <p>Vectors Understand addition of vectors. Understand subtraction of vectors.</p> <p>Recognise that subtracting a vector is the same as the addition of the negative vector.</p> <p>Understand scalar multiplication of vectors.</p> <p>Represent a 2-dimensional vector as a column vector.</p> <p>Draw column vectors on a square or coordinate grid.</p>	<p>Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°.</p> <p>Know the exact values of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60°.</p> <p>Use exact trigonometric values in simple situations.</p>	
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<p>Strategies</p> <p>Conditional Knowledge</p> <p>'I know when to'</p>	<p><u>Sequences</u></p> <p>Study sequences from a range of real-life contexts, representing solutions in words, pictorially, graphically and algebraically.</p> <p><u>Compound units</u></p> <p>Perform calculations involving speed and density in problem solving contexts.</p> <p><u>Equations and Inequalities</u></p> <p>Explain the meaning of inequality intervals represented on a number line.</p> <p>Form algebraic inequalities in order to solve problems set in a range of contexts.</p>	<p><u>Direct and Inverse Proportion</u></p> <p>Solve ratio and proportion problems.</p> <p>Understand the relationship between ratio and linear functions.</p> <p>Assess whether a relationship is one of inverse proportion by determining whether the stated values pairs multiply to give a constant.</p> <p><u>Graphs</u></p> <p>Recognise and interpret graphs that illustrate direct and inverse proportion.</p>	<p><u>Transformations</u></p> <p>Using concise mathematical language, construct a chain of reasoning to describe the transformations from object to image.</p> <p>Determine a single transformation that will successfully map an object to its image, as previously defined by a series of transformations.</p> <p>Make links with coordinates and equations of straight lines.</p> <p><u>Similar Figures</u></p> <p>Construct a chain of reasoning to describe the transformations from object to image using concise mathematical language.</p> <p>Make links to area problems involving enlargement on coordinate grid.</p> <p>Construct chain of reasoning to achieve a given change in length, area or volume.</p>	<p><u>Functions and Graphs</u></p> <p>Present clear chain of reasoning in words and on graphs to achieve stated (x, y) coordinates</p> <p>Define rules with function machines to generate results.</p> <p><u>Vectors</u></p> <p>Use diagrams and vector notation to clearly present arguments and simple proofs.</p> <p>Use vector addition to solve problems of repeated translation.</p>	<p><u>Exact Calculations</u></p> <p>Construct chains of reasoning to achieve a given result for a complex calculation involving π, surds or exact trig ratios, with or without a calculator.</p> <p>Make and use connections between exact calculations and surds within different parts of mathematics, for instance solving right angled triangle problems where the lengths are given as simple surd expressions.</p>
<p>Examples of Key Questions</p>	<p>1) The first five terms of an arithmetic sequence are 2, 9, 16, 23 and 30. Find, in terms of n, an expression for the nth term of this sequence.</p> <p>2) Here is a sequence of patterns made from grey counters.</p> <p><small>Here is a sequence of patterns made from grey counters.</small></p>  <p>Work out the total number of counters to make pattern number 10.</p>	<p>1) Simplify the ratio 50 cm : 1.5 m</p> <p>2) If it takes 12 men 4 days to plant 100 trees, how long would it take the 12 men to plant 150 trees?</p>	<p>1) Describe fully the single transformation that maps triangle A onto triangle B.</p> 	<p>1) Draw the graphs of</p> <p>a) $y = 2x + 3$,</p> <p>b) $y = \frac{1}{(x+1)}$</p> <p>2)</p> <p>(a) Complete the table of values for $y = x^2 + x - 2$.</p> <p>(b) On the grid, draw the graph of $y = x^2 + x - 2$.</p>	<p>1) Find the length of the hypotenuse in a right angled triangle where one angle is 60° and the adjacent side is 3cm.</p> <p>2) Work out the volume of the cylinder. Give your answer in terms of π.</p> 

	<p>3) A car travels a distance of 230 miles in 4 hours and 15 minutes. Work out the average speed of the car, in miles per hour. Give your answer to 1 decimal place.</p> <p>4) Solve $4x \leq x + 6$ Show your answer on a number line.</p>	<p>3) Find the equation of line L</p>  <p>4) Emily drove to the beach. She stayed at the beach and then she drove back home. Here is Emily's travel graph.</p>  <p>For how many minutes did Emily stay at the beach?</p>	<p>2) The two triangles ABC and PQR are mathematically similar. Calculate the length PR.</p> 	<p>3) Write as a column vector</p> <p>i) $\mathbf{a} + \mathbf{b}$</p> <p>ii) $2\mathbf{a} + 3\mathbf{b}$</p> $\mathbf{a} = \begin{pmatrix} 2 \\ 3 \end{pmatrix} \text{ and } \mathbf{b} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$ <p>4) Find, in terms of \mathbf{a}, the vector \overrightarrow{AD}</p> 		
Assessment topics	Mini assessments of each topic studied	Autumn PPEs (all topics studied thus far)	Feedback on autumn PPEs Mini assessments of each topic studied	Spring PPE (all topics)	Completion of feedback from of Spring PPEs	
Cross curricular links/ Character Education	<p>Music - links between mathematical sequences and rhythm patterns</p> <p>Science – speed and density calculations</p> <p>PE – awareness of speed and rates such as kilometres per hour</p>	<p>Use of graphs in ICT, Geography and Science</p> <p>Direct and Inverse proportion used to derive scientific formulae</p>	<p>Transformations are used in Art through cubism and tessellations by Escher</p> <p>Design Technology uses similarity and scale in planning ideas</p>	<p>In Music, sonata and symphonic form can be represented graphically</p> <p>Science – graphs of waves and wave equation calculations</p> <p>Science – vectors linked to resultant force</p>		