



## Overview plans for academic year 2023-2024

**Subject: Mathematics**

**Year group/cohort: Year 11**

	<b>Knowledge and Understanding</b>	<b>Knowledge and Understanding</b>	<b>Skills</b>	<b>Skills</b>	<b>Assessment</b>	<b>Subject specific literacy</b>	<b>Cross curricular links</b>
	Components (Key concepts)	Composite (Bigger picture)	Components (Key concepts)	Composite (Bigger picture)	What is being assessed, how, and when?	Key Vocabulary	Including Personal Development and SMSC
<b>Autumn Term</b>	Understand, recall and use Pythagoras' Theorem in 2D to calculate the length of the hypotenuse or a shorter side Given 3 sides of a triangle, justify if it is right-angled or not Apply Pythagoras' Theorem with a triangle drawn on a coordinate grid Calculate the length of a line	Pythagoras' Theorem	To be able to identify the hypotenuse. To be able to square two numbers. To be able to square root the calculation	To be able to apply the skills needed to successfully use the formula for Pythagoras' Theorem	<b>AQA topic test</b> Apply the formula for Pythagoras' theorem to find the lengths of a right-angled triangle. Be able to use multiple steps to find missing sides in compound shapes connecting to Pythagoras'.	Hypotenuse Line Segment	Agriculturists, such as farmers, gardeners and environmentalists all need this mathematical formula. In a job where, precise lines need to be drawn and measured to determine growing spaces and yearly yield a tool like the Pythagorean theorem is vital. whether they work in an

	segment AB given pairs of points						advisory position such as inspectors, or work more directly with food crops, animals, trees and plants, agriculturists need math.
<b>Autumn Term</b>	Identify, name, and draw parts of a circle Find circumferences and areas enclosed by circles Find radius/diameter, given area/perimeter of a circles Calculate perimeters and areas of composite shapes made from circles and parts of circles Calculate arc lengths, angles and areas of sectors of circles (including halves and quarter circles) Find the surface	Circles, Cylinders, Cones, and Spheres	To understand the parts of a circle. To apply formula for the circumference and area of a circle To extend the formulas of circles to cylinders. To be able to use circles with other shapes and apply the formulas. To find the volume of shapes using the formula To find the surface area of a shape by breaking down the shape in order to calculate each of the areas.	Apply the area and circumference formula. Use of a calculator to correctly calculate using pi. If calculating compound shape understand the process of splitting up the shape to accurately calculate the area and perimeter of the shape. To understand how sectors are used in circles. Calculate the surface area of shapes.	<b>AQA topic test</b> Calculate the area and circumference of a circle. Identify parts of a circle including arc and sector. Apply the formula for area and circumference of a circle. Find area and perimeter of compound shapes.	Circumference Area Sector Compound Radius Diameter Arc Perimeter.	The use of circles is a key component of landscaping, building and construction.

	area and volume of a cylinder Find the surface area and volume of spheres, pyramids, cones and composite solids						
<b>Autumn Term</b>	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 Use the trigonometric ratios to solve 2D problems Know the exact values of $\sin \theta$ , $\cos \theta$ and $\tan \theta$ for $\theta = 0^\circ$ , $30^\circ$ , $45^\circ$ , $60^\circ$ and $90^\circ$	Trigonometry	To use the ratios of SINE, COSINE AND TANGENT to find the sides of any triangle. To use the ratios of SINE, COSINE and TANGENT to find angles in any triangle. To understand the relationship of the values connected to the trigonometrical values.	Apply the correct trigonometric ratio when finding a length in a triangle. Apply the correct trigonometric ratio when finding the angle in a triangle. Consider the graphs of SINE, COSINE and TANGENT to understand the corresponding numerical value. Extend into multi step problems,	<b>AQA topic test</b> Be able to correctly identify the correct trigonometric ratio and apply it to the given triangle. Understand that there is a relationship to the graphs of trigonometric functions to use in equations.	Trigonometry SINE COSINE TANGENT Triangle Angle Hypotenuse Opposite Adjacent.	Astronomy, Sound waves, Navigation, Marine Biology, Aviation, Industry of manufacturing, Crime investigation, medical imaging, and Pharmacy.
<b>Autumn Term</b>	Use the basic congruence criteria for triangles Solve angle problems involving	Similarity and Congruence in 2D	Use congruency to establish identical shapes. Use a scale factor to establish similar triangles.	Understand and use scale factor when enlarging a shape. Use the scale factor to when	<b>AQA topic test</b> Use scale factors to enlarge a shape. Be able to apply the correct scale	Scale Enlargement Factor Corresponding Similar	Construction, Building, Brick laying, Windows

	<p>congruence 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.</p>		<p>Identify and apply the correct scale factor. Use the correct scale factor when enlarging a shape.</p>	<p>applying the rules of similar triangles. Solve similar shape problems including negative scale factors.</p>	<p>factor when finding similar shapes. Use enlargement with perimeters and multi-step problems. Understand and use the scale.</p>		
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<b>Autumn Term</b>	Understand and use column notation in relation to vectors Be able to represent information graphically given column vectors Identify two column vectors which are parallel Calculate using column vectors, and represent graphically, the sum of two vectors, the difference of two vectors and a scalar multiple of a vector.	Vectors	Understand vector notation. Understand column notation. Apply vectors in a graphical situation. Calculate vectors using column notation. Apply scale factors to column vectors.	Use column vectors to add and subtract. Apply the correct scale factor to column vectors and be able to calculate using column vectors. Graphically represent vectors. Be able to apply the laws of vectors to identify parallel vectors.	<b>AQA topic test</b> Graphically represent vectors on a graph. Calculate vectors using column vectors. Understand the use of vectors when they are parallel.	Vector Parallel Notation Column Graphically Scalar	Navigation Velocity Acceleration Force Angular displacement
<b>Autumn Term</b>	Multiply together two algebraic expressions with brackets Square a linear expression Factorise quadratic expressions of the form $x^2 + bx + c$ Factorise a	Quadratic Equations	Multiply two brackets to form an equation. Factorise a quadratic equation into two brackets. Apply the rules of the difference of two squares.	Use the laws of brackets to expand a quadratic to form an equation. Given a quadratic equation factorise into two brackets. Apply the rules of a difference of two	<b>AQA topic test</b> Be able to expand a quadratic equation. Be able to factorise a quadratic equation into two brackets.	Brackets Quadratic Linear Expression Factorise Indices Roots	Profit and loss Athletics Finding speed

	quadratic expression $x^2 - a^2$ using the difference of two squares Solve quadratic equations by factorising Find the roots of a quadratic function algebraically.			squares to solve an equation. Find the roots of a quadratic equations algebraically.	Apply the difference of two squares to solve an equation,		
<b>Autumn Term</b>	Generate points and plot graphs of quadratic functions Find approximate solutions to quadratic equations using a graph Interpret graphs of quadratic functions from real-life problems Identify and interpret roots, intercepts and turning points of quadratic graphs.	Quadratic Graphs	Generate points to plot a quadratic graph. Use a quadratic graph to find solutions. Interpret the graph, for example negative or positive quadratics. Understand where the quadratic graphs turning point occurs.	Use a table of values to find the coordinates to plot the graph. Accurately plot the points on a graph. Sketch the graph with a free hand. Identify roots and turning points.	<b>AQA topic test</b> Plot the corresponding coordinates onto the graph. Connect the points using a free hand. Identify roots and turning points to solve the quadratic.	Graph Quadratic Turning point Negative Positive Solutions Points	Used in medical trials to look at dose. Speed, distance, and time. Used widely in industry to look at different roots and how they change using different numbers.

<p><b>Autumn Term</b></p>	<p>Change the subject of a formula involving the use of square roots and squares          Answer 'show that' questions using consecutive integers, squares, even numbers and odd numbers          Solve problems involving inverse proportion using graphs, and read values from graphs          Find the equation of the line through two given points          Recognise, sketch and interpret graphs of simple cubic functions          Recognise, sketch and interpret graphs of the reciprocal function <math>y = 1/x</math> with <math>x \neq 0</math>; Use graphical representations of inverse</p>	<p>Rearranging Equations and Graphs of Cubic and Reciprocal Functions</p>	<p>Use equations to rearrange equations to isolate a variable. Use of indices and how they apply when rearrange a variable. Identify quadratic, cubic, and reciprocal graphs.          Sketch the graphs of cubic, quadratic, and reciprocal graphs,</p>	<p>Identify and apply the rules of equation to isolate the correct subject. Use indices accurately to enable the chosen subject to be identified.          Sketch the graphs of a quadratic graph.          Sketch the graph of a cubic graph.          Sketch the graph of a reciprocal graph.</p>	<p><b>AQA topic tests</b>          Rearrange an equation to find the chosen subject. Use the law of indices to rearrange the equation correctly. Be able to plot and identify the quadratic, cubic and reciprocal.</p>	<p>Rearrange Equation          Cubic          Reciprocal          Square          Cubed</p>	<p>In medicine to isolate a particular medication and test how it changes with various changed to dose.</p>
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	proportion to solve problems in context; identify and interpret the gradient from an equation $ax + by = c$ ;						
<b>Spring Term</b>	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	Simultaneous Equations	Using a real-life situation be able to convert this into two linear equations and then solve them simultaneously. Graphically solve to linear equations and give solutions,	Solve two simultaneous equations to find the solution of the two variables. Use multipliers if needed to solve the simultaneous equation. Use a graph to be able to solve where the two solutions for the variable.	<b>AQA topic test</b> Use a real-life situation and convert it into two simultaneous equations. Solve tow simultaneous equations to find the two variables. Using a graph identify and solve the two variables.	Simultaneous Linear Algebraically Coordinates	In banking to determine the best loan choice considering the interest rates.
<b>Spring Term</b>	Content based on Question Level Analysis from Rehearsal Exam 1	Bespoke Scheme of Work					



<b>Summer Term</b>	Content based on Question Level Analysis from Rehearsal Exam 2						
<b>Summer Term</b>	Content based on Question Level Analysis from Rehearsal Exam 2						

**Subject Information including exam board details:**

The key stage 4 curriculum is following the scheme of work for AQA. As part of the scaffolding, we use the white rose scheme to ensure that pupils are challenged and aiming for a good pass at GCSE. Pupils will be tested at the end of each term to monitor progress and ensure that pupils are achieving the correct level. If pupils are identified for under achievement, then intervention will be applied so that they can be given the support to help them gain more confidence and go on to achieve their potential.

**Careers linked to this subject area:**

Education, Engineering, Finance, Banking, Accountancy, Engineering, Economist, Data analysis, Electrical engineer, Meteorologist, software developer, Stockbroker.

**Enrichment Opportunities:**

Enrichment is the **enhancement of mathematical experiences** and may feature the study of mathematics beyond the standard curriculum as defined by the requirements of any external examinations. Alternative and creative approaches to topics, including open-ended investigations. Accessible aspects of mathematics lying outside the curriculum.