Maths Y11

Curriculum Overview

Hawkley Hall High School

Key Stage 4 Curriculum Journey: Maths Year 11

	Week 1 → Week 39								
F **C/O** **H**	*Unit 8* *Transformations and Constructions*	*Unit 9* *Probability*	*Unit 10* *Multiplicative Reasoning*	*Unit 11* *F: Quadratic Equations and Graphs.* *H: Similarity and Congruence*	*Unit 12* *F: Similarity, Congruence and Vectors* *H: Further Trigonometry*	*Unit 13* *F: More Algebra* *H: Circle Theorems*	*Unit 14* *H: Further Algebra*	*Unit 15* *Vectors*	*Unit 16* *H: Proportion and Graphs*
Key content (know that…Know how…)	Draw a reflection of a shape in a mirror line Enlarge a shape given a scale factor Recognise 3D shapes and their properties Draw nets of 3D solids Translate a shape and describe a translation on a coordinate grid using a vector Reflect a shape and describe a reflection on coordinate grid Rotate a shape and describe rotation on a coordinate grid Enlarge a shape through a centre of enlargement Describe an enlargement Transform shapes using more than one transformation	Calculate simple probabilities use two-way tables to record outcomes from two events Compare probabilities Apply systematic listings Find probabilities of mutually exclusive events Draw and interpret sample space diagrams Work out expected results based on theoretical probability Interpret probabilities based on experimental data Draw and interpret frequency trees Use Venn diagrams to work out probability Use the language of sets when	Use the unitary method to solve proportion problems Calculate best buys Recognise and use direct proportion on a graph Solve word problems involving direct proportion Solve word problems involving inverse proportion Solve problems involving compound measures (e.g. speed, density, pressure) Use kinematics formulae Convert between metric speed measures Link proportion relationships to ratio Write and use equations to solve	F: plot and interpret graphs and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration Solve quadratics algebraically F: simplify and manipulate algebraic expressions by expanding products of two binomials simplify and manipulate algebraic expressions by factorising quadratic expressions of the form x2 + bx + c, including the difference of two squares	F: Describe translations as 2D vectors Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement. express a multiplicative relationship between two quantities as a ratio or a fraction Compare lengths, areas and volumes using ratio notation F: Make links to similarity (including trigonometric ratios) and scale factors Use the basic congruence criteria for	F: Order positive and negative integers, decimals and fractions; use the symbols =, ≠, <, >, ≤, ≥ understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors Understand and use standard mathematical formulae. Rearrange formulae to change the subject F: Provide arguments to show mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments … use the form y = mx + c to identify parallel lines; find	Simplify algebraic fractions. Multiply and divide algebraic fractions. Solve quadratic equations arising from algebraic fraction equations. Change the subject of a formula where all variables are in the denominators. Solve 'Show that' and proof questions using consecutive integers (n, n + 1), squares a2, b2, even numbers 2n, odd numbers 2n +1; Use function notation. Find f(x) + g(x) and f(x) – g(x), 2f(x), f(3x) etc algebraically. Find the inverse of a linear function. Know that f^ –1(x) refers to the inverse function. For two functions f(x) and g(x), find gf(x). find approximate solutions to	Addition and subtraction of vectors. Multiplication of vectors by a scalar. Diagrammatic and column representations of vectors. Use vectors to construct geometric arguments and proof Understand and use vector notation, including column notation, and understand and interpret vectors as displacement in the plane with an associated direction. Find the length of a vector using Pythagoras' Theorem. Solve geometric problems in 2D where vectors are divided in a given ratio.	Recognise, sketch and interpret graphs of the reciprocal function and State the value of x for which the equation is not defined. Recognise, sketch and interpret graphs of exponential functions. Use calculators to explore exponential growth and decay and set up, solve and interpret the answers in growth and decay problems. "Interpret and analyse transformations of graphs of functions and write the functions algebraically: write the equation of f(x) + a, or f(x – a). " Apply to the graph of y = f(x) the transformations y = –f(x), y = f(–x) for

	Describe combined transformations Interpret and draw plans and elevations of 3D shapes Draw and interpret scale diagrams Bisect lines and angles using a ruler and a compass Construct perpendiculars through a point on a line and from a point to a line Construct triangles given SSS, ASA, SAS etc Draw and identify regions bound by loci to solve practical problems Find and use bearings Use angles in parallel lines to solve problems involving bearings Enlarge a shape through a centre of enlargement with a negative scale factor Interpret invariance in transformations problems Apply Pythagoras and trigonometry	interpreting Venn diagrams Draw and interpret tree diagrams for independent events Draw and interpret tree diagrams for dependent events Use the product rule for finding the number of outcomes for two or more events Solve more complex problems involving conditional probability Solve algebraic probability problems	problems involving direct proportion Write and use equations to solve problems involving inverse proportion Recognise graphs showing inverse proportion	identify and interpret roots, intercepts, turning points of quadratic functions graphically Recognise, sketch and interpret graphs of quadratic functions plot and interpret reciprocal graphs solve quadratic equations algebraically by factorising; find approximate solutions using a graph H: Make links to similarity (including trigonometric ratios) and scale factors Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS) apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including … the fact that the base angles of an	triangles (SSS, SAS, ASA, RHS) apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including … the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs Calculate: surface area and volume of spheres, pyramids, cones and composite solids to allow application of congruence and similarity. Apply the concepts of congruence and similarity between lengths in similar figures Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and	the equation of the line through two given points, or through one point with a given gradient A10 identify and interpret gradients and intercepts of linear functions graphically and algebraically solve two simultaneous equations in two variables (linear/linear) algebraically; find approximate solutions using a graph translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution. solve problems involving direct and inverse proportion, including graphical and algebraic representations … recognise and interpret graphs that illustrate direct and inverse proportion	equations numerically using iteration	Understand that 2a is parallel to a and twice its length, and that a is parallel to –a in the opposite direction. Produce geometrical proofs to prove points are collinear and vectors/lines are parallel.	linear, quadratic, cubic functions; apply to the graph of y = f(x) the transformations y = f(x) + a, y = f(x + a) Calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs) and interpret results in cases such distance–time graphs, velocity–time graphs and graphs in financial contexts (this does not include calculus) Interpret the gradient of non-linear graph in curved distance–time and velocity–time graphs: For a non-linear distance–time graph, estimate the speed at one point in time, from the tangent, and the average speed over several seconds by finding the gradient of the chord; For a non-linear velocity–time graph, estimate the acceleration at one point in time, from the tangent, and the average acceleration over

	to bearing problems			isosceles triangle are equal, and use known results to obtain simple proofs Calculate: surface area and volume of spheres, pyramids, cones and composite solids to allow application of congruence and similarity. Apply the concepts of congruence and similarity between lengths in similar figures H: Apply the concepts of congruence and similarity, including the relationships between areas and volumes in similar figures	enlargement (including fractional scale factors) Apply addition and subtraction of vectors, multiplication by vectors by a scalar, and diagrammatic and column representations of vectors. H: recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function To be able to use Pythagoras Theorem to find the missing side in a right-angle triangle To be able to use trigonometry to find a missing side or angle in a right angle triangle To know and apply the exact values of trigonometry H: know the formulae for: Pythagoras'	H: Identify and apply circle definitions and properties, including tangent, arc, sector and segment. H: Recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point Recognise and construct the graph of a circle using x2 + y2 = r2 for radius r centred at the origin of coordinates. Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results.			several seconds by finding the gradient of the chord; Interpret the gradient of a linear or non-linear graph in financial contexts. Interpret the area under a linear or non-linear graph in real-life contexts.

					Theorem a2 + b2 = c2 and the trigonometric ratios, sine, cosine, and tan; apply them to find angles and lengths in right-angled triangles three dimensional figures To be able to use trigonometry to find angles of elevation and depression To understand proof of how to derive the exact values for trigonometry Know and apply the sine rule to find unknown sides and angles Know and apply the cosine rule to find unknown sides and angles Know and apply area = 1/2ab Sin c to calculate the area, sides, or angles in any triangle "Recognise, sketch and interpret graphs of exponential, functions y = kx for positive values of k, and the trigonometric				

					functions (with arguments in degrees) y = sin x, y = cos x and y = tan x for angles of any size" sketch translations and reflections of a given function and apply to the graph of y = f(x) the transformations y = –f(x), y = f(–x) for sine, cosine and tan functions f(x). "sketch translations and reflections of a given function and apply to the graph of y = f(x) the transformations y = f(x) + a, y = f(x + a) for sine, cosine and tan functions f(x)."				

Prior Knowledge	Students should recognise reflection symmetry, be able to identify and draw lines of symmetry, and complete diagrams with given number of lines of symmetry. Students should recognise rotation symmetry and be able to identify orders of rotational symmetry, and complete diagrams with given order of rotational symmetry. Students should recall basic shapes. Students should be able to plot points in all four quadrants. Students should have an understanding of the concept of rotation. Students should be able to draw and recognise lines parallel to axes and $y = x$, $y = -x$. Students will have encountered the terms clockwise	Students should understand that a probability is a number between 0 and 1, and distinguish between events which are impossible, unlikely, even chance, likely, and certain to occur. Students should be able to mark events and/or probabilities on a probability scale of 0 to 1. Students should know how to add and multiply fractions and decimals. Students should have experience of expressing one number as a fraction of another number.	Students should be able to interpret scales on a range of measuring instruments. Students should be able to find a percentage of an amount and relate percentages to decimals. Students should be able to rearrange equations and use these to solve problems. Students should know speed = distance/time, density = mass/volume	Students should be able to square negative numbers. Students should be able to substitute into formulae. Students should be able to plot points on a coordinate grid. Students should be able to expand single brackets and collect 'like' terms. Students should be able to recognise and enlarge shapes and calculate scale factors. Students should have knowledge of how to calculate area and volume in various metric measures. Students should be able to measure lines and angles, and use compasses, ruler and protractor to construct standard constructions.	Students should be able to recognise and enlarge shapes and calculate scale factors. Students should have knowledge of how to calculate area and volume in various metric measures. Students should be able to measure lines and angles, and use compasses, ruler and protractor to construct standard constructions. Students should be able to use axes and coordinates to specify points in all four quadrants. Students should be able to recall and apply Pythagoras' Theorem and trigonometric ratios. Students should be able to substitute into formulae.	Students should be able to draw linear graphs. Students should be able to plot coordinates and sketch simple functions with a table of values. Students should be able to substitute into and solve equations. Students should have experience of using formulae. Students should recall and use the hierarchy of operations and use of inequality symbols. Students should have practical experience of drawing circles with compasses. Students should recall the words, centre, radius, diameter and circumference. Students should recall the relationship of the gradient between two perpendicular lines. Students should be able to find the equation of the straight line, given a gradient and a coordinate.	Students should be able to simplify surds. Students should be able to use negative numbers with all four operations. Students should be able to recall and use the hierarchy of operations. Students should be able to draw linear and quadratic graphs. Students should be able to calculate the gradient of a linear function between two points. Students should recall transformations of trigonometric functions. Students should have knowledge of writing statements of direct proportion and forming an equation to find values	Students will have used vectors to describe translations and will have knowledge of Pythagoras' Theorem and the properties of triangles and quadrilaterals.	Students should be able to draw linear and quadratic graphs. Students should be able to calculate the gradient of a linear function between two points. Students should recall transformations of trigonometric functions. Students should have knowledge of writing statements of direct proportion and forming an equation to find values

	and anticlockwise previously.								
GCSE Assessment Objectives	G12 R12 G12 G13 G24 G7 G7 G7 G7 G7 G8 G13 R2 G2 G2 G2 G2 G15 G15 G7 G8 G15	P1 P6 P2 N5 P4 N5 P7 P1 P1 P9 P9 P8 P8 P7 P9 P9	R10 R10 R10 R11 R13 R1 R11 R11 R7 R1 R13 R14	Foundation unit A14 A11 A4 A4 A11 A12 A14 A18 Higher Unit R6 G5 G6 G17 G19 G19	Foundation Unit G24 G7 R6 R6 R12 G5 G6 G17 G19 G7 G25 Higher Unit A12 G20 G20 G21 G20 A6 G22 G22 G23 A12 A13 A13	Foundation Unit N1 A3 A5 A5 A6 A9 A19 A21 R10 R14 Higher Unit G9 A16 A16 G10	A4 A4 A4 A5 A6 A7 A7 A7 A7 A7 A20	G25	A13 A12 R16 A13 A13 A13 A15 R15 R15 R15 R15 R15

Assessments	End of Unit assessment	End of Unit assessment	End of Unit assessment	End of Unit assessment	End of Unit assessment	End of Unit assessment	End of Unit assessment	End of Unit assessment	End of Unit assessment