

# Mathematics Year 10 Higher

Term	1	2	3	4	5	6	
Topic	Number and Geometry 1	Algebra 1	Statistics 1	Ratio	Geometry 2	Statistics 2	Algebra 2
Detail	Applying the area of a variety of shapes including triangles, circles, sectors and compound shapes. Understand and apply upper and lower bounds in context. Know, use and apply the formulae for finding the volume and surface area of cylinders, cones, spheres and pyramids.	Apply knowledge of algebra through to solving and creating simultaneous equations involving quadratic equations including solving quadratic equations by a variety of methods.	Extend current knowledge of probability to include probability tree diagrams, Venn diagrams and set notation.	Understand the concepts of direct and inverse proportion and how it is applied to a graph. Understand and apply compound measures into scientific contexts. Investigate multipliers when comparing compound interest, growth and decay	Recall and extend use of Pythagoras' Theorem in both 2D and 3D situations. Develop skills in trigonometry including SOHCAHTOA, sine and cosine rule. Understand and use trigonometric graphs and know exact value of trigonometric functions. Apply trigonometry into 3D. Identify and prove tangency in circles.	Draw and interpret cumulative frequency diagrams, box plots, and histograms to compare data sets. Understand and perform random sampling. Identify a sampling and data collecting using the capture-recapture method.	Revision and extension of expanding brackets to three binomials. Extend inequalities to identifying and describing regions on a graph. Investigate roots and turning points on a quadratic graph and their links with solving and completing the square of quadratic equations.
Grade 8-9	Applying upper and lower bounds.	Solve quadratic equations by completing the square. Create and solve simultaneous equations with one quadratic equation.		Apply upper and lower bounds with right angled trigonometry. Apply Pythagoras' Theorem and Trigonometry to 3D situations.		Find the coordinates of turning points using completing the square. Discuss whether a quadratic equation has no roots, two roots or a repeated root.	
Grade 6-7	Perform and describe an enlargement by a negative scale factor.	Solve quadratic equations with the quadratic formula.	Understand and use Venn diagrams and set notation. Use Venn diagrams to find probability.	Use multipliers for compound interest, growth and decay. Calculate rates of change. Create and use formulae for direct and inverse proportion. Use similarity with areas and volumes of shapes.	Know and use the sine, cosine and tangent graphs. Know and use the Sine and Cosine rules to find an angle or a side.	Draw and interpret cumulative frequency tables and diagrams. Draw and compare plots for data sets. Draw, interpret and compare data represented in a histogram with unequal bar widths.	Represent inequalities on a graph. Identify and describe regions represented by inequalities. Solve a quadratic equation using in iterative processes. Expand the product of three binomials.
Grade 5	Write error intervals using inequalities. Find and use the perimeter and area of rectangles. Find and use the formulae for finding the volume and surface area of spheres, cones and pyramids. Solve problems involving volume and surface area. Draw and use tools to solve problems.	Factorise expressions up to quadratic expressions. Find the roots or solutions of quadratic functions. Solve simultaneous equations algebraically. Create and solve linear simultaneous equations.	Create and use probability tree diagrams for dependent events.	Investigate, explore and calculate with right angled trigonometry. Know the exact values of sine, cosine, tangent of 0°, 30°, 45°, 60°, 90 degrees. Identify and prove congruent triangles (ASA, SAS, AAS, RHS). Use known facts such as angle facts, similarity, congruency and properties of quadrilaterals to create simple geometric proofs. Explain why the base angle in an isosceles triangle must be equal.	Understand and perform a stratified sample. Find estimates using the capture-recapture model of data collection.	Factorise a quadratic expression to the form $a(x-b)(x-c)$ . Factorise a quadratic expression in the form $a^2x^2 + b$ or $x^2 + b$ . Explain, reason and prove using expanding and factoring. Create an expression or formula to describe a situation using expansion or factorisation. Sketch and interpret graphs of cubic functions.	
Grade 4	Identify upper and lower bounds. Construct triangles using just 3 of compass and a ruler. Construct perpendicular and angle bisectors. Construct a variety of 2D shapes using ruler and compass.	Solve linear equations up to the quadratic function. Construct the angle bisector of an angle and the perpendicular bisector of a line. Solve identity algebra problems and represent inequalities with a number line.	Create and use probability tree diagrams for independent events.	Use and apply Pythagoras' Theorem in a 2D context.	Understand and use random sampling.	Expand and simplify the addition or subtraction of three of three binomials. Multiply two linear expressions of the form $(ax+b)(cx+d)$ . Multiply two linear expressions of the form $(a+bx)(c+dx)$ . Expand the expression $(a+bx)^2$ . Multiply an expression involving $\sqrt{a}$ by collecting like terms in one of 2D shapes and algebra or proof of identities.	
Grade 2-3	Find the area and perimeter of compound shapes including trapezium. Compare similar figures such as length, area and volume. Calculate surface area and volume of prisms and cylinders. Draw and use plans and elevations. Perform and describe reflections, rotations and translations of 2D shapes. Perform and describe enlargements of a 2D shape using positive and fractional scale factors. Draw and use scales on maps and scale drawings. Draw and solve problems using bearings. Construct triangles using a protractor.	Solve linear equations up to the quadratic function. Construct the angle bisector of an angle and the perpendicular bisector of a line. Solve identity algebra problems and represent inequalities with a number line.	Use outcomes of events and draw tree probability. Draw and use sample space diagrams. Recall and use the fact of mutually exclusive events adding to 1. Include use of right-angle. Investigate theoretical vs experimental probability. Create Area Diagram.	Recognise direct and inverse proportion through points on a graph.	Know and understand by vocabulary for sampling.	Revise drawing straight line graphs and quadratic functions.	

Keywords	1	2	3	4	5	6	
	perpendicular bisector, circle factor, congruence, inscribed, transformation, rotation, reflection, translation, enlargement, solid, spheres, pyramids, cone, perpendicular, chord, surface area, volume	unknown, solve, substitution, interval, iteration, simultaneous equations, substitution, elimination, rearrange, quadratic, difference of two squares, binomial, fractions, manipulate, deduct, prove	unknown, equality, happy outcomes, worst, independent, dependent, tree diagrams, random, bias, unbiased, fair, probability, set, conditional probability, Venn diagrams	perpendicular bisector, circle factor, similar, congruence, similar, percentage increase, percentage decrease, compound interest, simple interest, growth, decay, exponential	trigonometry, adjacent, hypotenuse, trigonometry, function, ratio, sine, cosine, tangent, angle of elevation, angle of depression	iteration, data, discrete data, continuous data, grouped data, sets, area, population, sample, cumulative frequency, pie chart, bar chart, mean, mode, median, spread, dispersion, consistency, range, interquartile range, skewness	linear, inequality, variables, inequalities, solve, substitution, set notation, region

Resource Links	<a href="#">KM: Enlargement 2</a>	<a href="#">MathsRevision.net</a>	<a href="#">DMT: Venn Diagrams</a>	<a href="#">KM: Stick on the Maths: KM: Congruence and Similarity</a>	<a href="#">KM: From set squares to trigonometry</a>	<a href="#">KM: Stick on the Maths HD: Statistics: HD: Comparing Distributions</a>	<a href="#">KM: Linear programming with Logs</a>
	<a href="#">KM: Stick on the Maths SSMB: Enlargement (fractional scale factors)</a>	<a href="#">KM: Babylonian logarithms - an introduction to iterative processes</a>	<a href="#">OCR: Check It Out: Combined Texts and Probability Diagrams</a>	<a href="#">KM: Convoluted: Congruence and Similarity</a>	<a href="#">KM: Trigonometry Chart</a>	<a href="#">KM: Cumulative Frequency and Box Plots</a>	<a href="#">KM: Linear programming (Autograph)</a>
	<a href="#">NRICH: Growing Rectangles</a>	<a href="#">KM: Iteration</a>	<a href="#">ASA: Bridging Unit-Measurement, Number Lines and Venn Diagrams</a>	<a href="#">Nrich: Surface Area and Volume</a>	<a href="#">NRICH: Trigonometric protractor</a>	<a href="#">NRICH: The Live of Presidents</a>	<a href="#">KM: Stick on the Maths R: Inequalities</a>
	<a href="#">KM: Stick on the Maths: A152: Simultaneous linear equations</a>	<a href="#">ASA: Bridging Unit-Measurement, Linear Equations</a>	<a href="#">OCR: Summerhouse and Reflections</a>	<a href="#">Nrich: Summerhouse and Reflections</a>	<a href="#">NRICH: Sine and cosine</a>	<a href="#">NRICH: Olympic Triathlon</a>	<a href="#">KM: Convince? Inequalities in two variables</a>
	<a href="#">KM: Convince? ASA: Simultaneous Linear Equations</a>	<a href="#">NRICH: Matching</a>	<a href="#">OCR: Congruence Check It Out: Similarity Check It Out</a>	<a href="#">Nrich: Greenhouse</a>	<a href="#">NRICH: Box Plot March</a>	<a href="#">NRICH: Which is bigger?</a>	<a href="#">NRICH: Which is bigger?</a>
	<a href="#">NRICH: Matching</a>	<a href="#">ASA: Bridging Unit-Measurement, Linear Equations</a>	<a href="#">KM: Stick on the Maths: R: Repeated Proportional Change</a>	<a href="#">Nrich: Greenhouse</a>	<a href="#">OCR: Sampling, Analyzing Data</a>	<a href="#">Nrich: How do we know?</a>	<a href="#">Nrich: How do we know?</a>
	<a href="#">ASA: Bridging Unit-Measurement, Linear Equations</a>	<a href="#">ASA: Bridging Unit-Measurement, Linear Equations</a>	<a href="#">KM: Convince? Repeated Proportional Change</a>	<a href="#">Nrich: Greenhouse</a>	<a href="#">Nrich: Which is bigger?</a>	<a href="#">MAD: Defining regions using inequalities</a>	<a href="#">MAD: Defining regions using inequalities</a>
	<a href="#">KM: Stick on the Maths: Quadratic Equations</a>	<a href="#">Nrich: What's possible?</a>	<a href="#">Nrich: Repeated Proportional Change</a>	<a href="#">Nrich: Greenhouse</a>	<a href="#">Nrich: Which is bigger?</a>	<a href="#">DMT: Inequality</a>	<a href="#">DMT: Inequality</a>
	<a href="#">NRICH: Finding Factors</a>	<a href="#">NRICH: Finding Factors</a>	<a href="#">Nrich: Greenhouse</a>	<a href="#">Nrich: Greenhouse</a>	<a href="#">Nrich: Which is bigger?</a>		
	<a href="#">Algebra Tiles (external URL)</a>	<a href="#">Algebra Tiles (external URL)</a>	<a href="#">Nrich: Golden Thoughts</a>	<a href="#">Nrich: Golden Thoughts</a>	<a href="#">Nrich: Golden Thoughts</a>		

Career Opportunities	Why Math is important?				Astronautics		Accident Research	Weather Forecasting	Research engineering - Lightning
	STEM careers	Operations Research	Aircraft Engineering	Banking/Business	Aircraft Wing Design	Statistics	Sports Performance	Maths with Maths	Statistical Business Decisions
							Securities	Space Scientist	Maths in Computing