YEAR 10 COURSE GUIDE

	Selected Success Criteria, from this year's course	
POWERS & ROOTS	• Understand, simplify and use index laws for multiplication, division, power of powers, negative powers and for power 0. • Evaluate fractional powers of numerical bases and understand any equivalents. • Add, subtract, multiply and simplify surds. • Simplify and rationalise surds with 1 or 2-term denominators	
RATIO & SCALE	• Divide a quantity into a 2 or 3-part ratio, given one part or the difference. • Solve problems with combining ratios, fractions, decimals, and percentages. • Draw & interpret accurate scale diagrams. Able to plot bearings on such diagrams	
BRACKETS	• Create arguments to show that 2 expressions are equivalent. • Simplify an algebraic fraction that involves factorising into a single bracket. • Expand and simplify the product of three brackets. • Factorise quadratic expressions where **a** is equal to or less than 1 and on a graph. • Factorise the difference of 2 squares.	
AREA & PERIMETER	• Solve area & perimeter problems involving more than one shape. • Use equations and brackets to solve equations in context to area & perimeter. • Identify different parts of the circle (tangent, chord, sector, segment, arc) • Calculate area, arc length or perimeter of a sector, and form and solve equations using this in relation to angles. • Use the area of a sector to calculate the perimeter.	
EQUATIONS	• Solve quadratic expressions by both factorising and the quadratic formula and interpret solutions as roots in relation to graphs. • Rearrange, expand, or simplify a quadratic equation before factorising and solving. • Reduce a quadratic equation to a=1 by dividing by a common factor. • Solve linear simultaneous equations using graphs, elimination, and re-arrangement. • Solve problems by forming and solving simultaneous equations.	
SOLIDS	• Calculate the volume of cuboids, prisms, cylinders, spheres, cones, and pyramids. • Solve context problems involving volume by solving equations. • Calculate the surface area of prisms, cylinders, spheres, cones, and pyramids. • Solve contextual problems involving surface area by solving equations.	
FRACTIONS	• Convert between fractions and recurring decimals. • Compare and order fractions, decimals, and percentages. • Add subtract, multiply, and divide with simple and complex algebraic expressions. • Increase or decrease a quantity by a fraction. • Find the result of a repeated fractional change.	
ANGLES	• Solve problems involving angles in parallel line and in polygons. • Understand how to apply the 7 circle theorems in relation to angles. • Able to reason that statements with numerical and algebraic angles are true. • Form and solve linear equations in the context of angles.	
LINEAR GRAPHS	• Plot line graphs that are and aren't of y = mx + c from a table of values. • Determine whether points lie on a line. • Find approx. solutions to linear equations using graphs. • Find equations of lines when given points, gradients, or parallel lines. • Understand and use gradients of perpendicular lines in problems.	
INEQUALITIES	• Identify and draw inequalities on number lines. • Solve inequalities with a negative unknown on one or both sides and identify possible integer solutions. • Solve 3-part inequalities, identifying integer solutions. • Represent and identify single inequalities through shaded regions on graphs and identify inequalities when only given the shaded region.	

STATISTICS 1	• Criticise data collection methods. • Find data values that can obtain a combination of statistics (mean, median, mode, range) and understand their varying reliability. • Use grouped frequency tables to find mean, total, modal class, and range. • Use un-grouped frequency tables to find mean, total, range and mode. • Construct and interpret frequency diagrams and stem and leaf diagrams, identifying mean, mode, median and range. • Identify misleading diagrams	
FORMULAE & FUNCTIONS	• Find numerical and algebraic outputs using function notation. • Find inputs, outputs and inverses of simple and composite functions. • Create a formula out of a given situation, and change the subject involving powers, roots and where the subject appears twice.	
TRIGONOMETRY	• Use Pythagoras theorem to find missing sides, including problems in 3D shapes. • Use Trigonometry to work out missing angles & sides and solve problems	
NUMBER	• Use a calculator to solve complex calculations. • Use prime factor form to find the LCM & HCF and solve contextual problems. • Able to divide decimals by transforming into an integer and estimate solutions. • Estimate powers and roots in context, judge if they are over or under-estimating. • Identify upper & lower bounds and error intervals for rounded numbers. • Solve problems with bounds of 2 numbers. • Truncate decimals & write error intervals for them.	
NON-LINEAR GRAPHS	• Plot & understand graphs of complex quadratics. • Find Approximate solutions of quadratics using graphs. • Plot & understand non-linear graphs (Cubic, reciprocal).	
COMPUND UNITS	• Solve problems of speed, distance, and time, where unit changing is required. • Complete & interpret distance/time graphs. • Solve problems of Density, mass, and volume, where unit changing is required.	
PROPORTION	• Solve problems with rates of pay, direct proportion, density, and other rates. • Identify directly proportional graphs and tables. • Construct formulae using direct and inverse proportion. • Know the features of an inverse proportion graph and relationship.	
PERCENTAGE	• Compare 2 quantities using percentages. • Identify percentage change, profit, or loss. • Find the result of repeated percentage change using a multiplier. • Solve problems with simple and compound interest. • Find original values using repeated percentage change.	
ADVANCED TRIGONOMETRY	• Use the sine and cosine rule to find missing angles and lengths in any triangle. • Solve a variety of problems in non-right-angled triangles.	
STATISTICS 2	• Use a sample to infer properties of a population. • Able to identify and interpret the IQR and quartiles. • Construct, interpret and compare box plots and cumulative frequency graphs. • Construct box plots given a cumulative frequency graph.	
SEQUENCES & PROOF	• Use algebra in proof with both odd and even numbers. • Use algebra in sequences and Fibonacci sequences, including surds. • Find the nth term of increasing, decreasing and quadratic sequences. • Determine the type of sequence a given sequence is.	
VECTORS	• Understand scalar and vector quantities, represent column vectors on grids. • Add, subtract, and multiply column vectors. • Identify vectors on a diagram.	
PROBABILITY	• Use a theoretical probability to identify a total. • Complete and use probability tree diagrams. • Solve algebraic expressions with probability. • Apply addition and multiplication laws of probability.	