NUMBER topics	Am I secure? **R**ed **A**mber **G**reen
Comparing and ordering numbers	
Calculating with integers	
Calculating with decimals	
Multiplying and dividing with fractions	
Using the order of operations	
Working with multiples, factors and prime numbers	
Applying systematic methods for listing groups	
Using the product rule for counting to enumerate the number of possible groups	
Calculating with powers and roots	
Estimating powers and roots of any given positive number	
Using the laws of indices	
Calculating with fractional indices	
Manipulating fractions and mixed numbers	
Adding and subtracting fractions and mixed numbers	
Simplifying surdic expressions	
Calculating with surds	
Rationalising the denominator of surdic fractions	
Working with numbers in standard form	
Converting between fractions and decimals	
Converting between recurring decimals and their corresponding fractions	
Using ratio notation	
Making links between fractions and ratios	
Calculating with percentages	
Converting between fractions and percentages	
Using common units of measurement	
Using estimation, including to check the accuracy of calculations	
Understanding the use of rounding	
Using upper and lower bounds	
Calculating minimum and maximum amounts, using upper and lower bounds	

ALGEBRA topics	Am I secure? **R**ed **A**mber **G**reen
Understanding algebraic notation	
Substituting into expressions and formulae	
Understanding and using algebraic language and symbols	
Simplifying algebraic expressions by collecting like terms	
Expanding and factorising using a single bracket	
Expanding and factorising using two brackets	
Using the laws of indices with algebraic terms	
Expanding using three brackets	
Factorising non-monic quadratic expressions	
Working with algebraic fractions	

Understanding and using formulae in words and algebraic formulae	
Rearranging algebraic formulae to change the subject	
Manipulating algebraic expressions to support statements	
Using algebraic expressions to prove outcomes	
Understanding and using function machines	
Interpreting the reverse of a function machine as the 'inverse function'	
Interpreting and using composite functions	
Working with coordinates in four quadrants	
Plotting straight line graphs	
Using $y = mx + c$ to identify parallel graphs	
Using $y = mx + c$ to identify perpendicular graphs	
Using $y = mx + c$ and two points, or one point and the gradient, to write the equation of a line	
Working out the gradient of a straight line	
Working out the *y*-intercept of a straight line	
Identifying roots, intercepts and turning points from a quadratic graph	
Calculating roots of a quadratic graph algebraically	
Deducing the turning point of a quadratic graph by completing the square	
Making links between different types of graphs and their equations	
Recognising, sketching and interpreting graphs of expontential functions	
Recognising, sketching and interpreting graphs of trigonometric functions	
Sketching translations and reflections of graphs of a given function	
Plotting and interpreting real-life graphs, including exponential graphs	
Solving problems involving speed, distance, time and acceleration using graphs	
Calculating (or estimating) gradients of graphs, and interpreting results in context	
Calculating (or estimating) areas under graphs, and interpreting results in context	
Recognising and using the equation of a circle with centre (0, 0)	
Finding the equation of a tangent to a circle at a given point	
Solving linear equations with one unknown	
Solving linear equations with one unknown on both sides	
Solving linear equations using graphs	
Solving quadratic equations, including those that require rearrangement, by factorising	
Solving quadratic equations by using the quadratic formula	
Solving quadratic equations by completing the square	
Solving quadratic equations using graphs	
Solving pairs of simultaneous equations using algebraic methods, including quadratic equations	
Solving pairs of simultaneous equations using graphs	
Finding approximate solutions to equations using iterative processes	
Forming and solving equations (including simultaneous equations) from contexts	
Solving linear inequalities with one or two variables	
Solving quadratic inequalities with one variable	
Representing inequalities on a number line	
Representing the solution set to inequalities using set notation	
Plotting inequalities in two variables to identify regions	
Writing the terms of a sequence from a rule given in words	
Writing the terms of a sequence from a given nth term	
Recognising and extending 'special' sequences (Square numbers, triangular numbers, ...)	
Recognising and extending 'other' sequences (Fibonacci, quadratic, geometric, ...)	

Recognising and extending geometric sequences where the common ratio is a surd	
Writing the nth term of a linear sequence	
Writing the nth term of a quadratic sequence	

RATIO AND PROPORTION topics	Am I secure? **R**ed **A**mber **G**reen
Changing freely between standard units of length, mass, volume, time, compound units	
Using scale factors	
Using scale diagrams and maps	
Writing one amount as a fraction of another	
Simplifying ratios to their lowest terms	
Writing a ratio in the form 1 : n and n : 1	
Sharing amounts in a given ratio	
Sharing amounts in contextual problems	
Comparing amounts using ratios and fractions	
Using proportion as the equality of ratios	
Relating ratios to fractions	
Relating ratios to equations	
Understanding the meaning of a percentage	
Calculating percentages, and percentage changes, using a multiplier	
Writing one amount as a percentage of another	
Comparing amounts using percentages	
Working with percentages greater than 100%	
Writing change as a percentage	
Calculating using percentages in reverse	
Calculating using simple interest	
Solving problems involving direct proportion	
Solving problems involving inverse proportion	
Working with speed, distance and time	
Working with density, mass and volume	
Working with pressure, force and area	
Working with rates and the unitary method	
Solving length, area and volume problems with similar shapes	
Solve problems involving trigonometric ratios and similarity	
Understanding and using direct proportion algebraically	
Understanding and using inverse proportion algebraically	
Constructing and interpreting equations that describe direct and inverse proportion	
Understanding that the gradient of a line represents a rate of change	
Recognising graphs that depict direct and inverse proportion	
Interpreting the gradient at a point on a curve as an instantaneous rate of change	
Applying the concepts of average and instantaneous rates of change in context	
Working with repeated proportional changes using a multiplier and a power, including compound percentages	
Working with general iterative processes	

GEOMETRY topics	Am I secure? **R**ed **A**mber **G**reen
Using mathematical names and conventions with geometric figures	
Using a straight edge and a pair of compasses to construct:	
the perpendicular bisector of a line segment	
a perpendicular to a given line from and at a given point	
the bisector of a given angle	
an accurate drawing of a sketch of a geometric figure	
Using constructions to solve loci problems	
Using angle facts to solve problems, including:	
the sum of angles at a point, and on a straight line	
vertically opposite angles	
alternate and corresponding angles in parallel lines	
the sum of angles in a triangle	
the sum of angles in polygons, using the sum of angles in a triangle	
Describing the properties of common quadrilaterals	
Using the basic criteria for congruent triangles	
Reasoning mathematically with geometric figures	
Applying and describing the transformation of geometric figures using reflection, rotation, translation and enlargement	
Describing the effect of a combination of transformations	
Describing invariance in transformations	
Identifying and naming the parts of a circle	
Applying and proving the standard circle theorems	
Solving problems using coordinates	
Identifying and naming common 3D solids	
Identifying and naming the parts of a 3D solid	
Constructing plans and elevations of 3D solids	
Using standard units of measure (length, area, volume/capacity, mass, time, money, etc.)	
Measuring and drawing lines angles	
Interpreting maps and scale drawings	
Using bearings to describe direction	
Knowing and applying formulae to calculate using:	
area of triangles, parallelograms, trapezia	
volume of cuboids	
volume of prisms	
volume of cylinders	
Knowing and applying formulae to calculate using:	
circumference of circles	
area of circles	
Calculating the area and perimeter of compound shapes, involving circles	

Calculating the surface area and volume of spheres, pyramids, cones and composite solids, using given formulae	
Calculating using the lengths of arcs and the area of sectors	
Understanding the effect of transformations, applying this to congruence and similarity	
Applying the concepts of similarity to calculate areas and volumes of similar figures	
Knowing and using Pythagoras' Theorem to calculate lengths in right-angled triangles	
Knowing and using the trigonometric ratios to calculate lengths in right-angled triangles	
Knowing and using the trigonometric ratios to calculate angles in right-angled triangles	
Applying Pythagoras' Theorem and the trigonometric ratios in 3D	
Knowing the exact values for specific trigonometric ratios	
Applying the sine rule to find unknown lengths and angles	
Applying the cosine rule to find unknown lengths and angles	
Calculating the area, sides and angles in angle triangles using $\frac{1}{2}ab\sin C$	
Describing translation in 2D using vectors	
Calculating using 2D column vectors	
Using vectors to construct geometric arguments and proofs	

PROBABILITY topics	Am I secure? **R**ed **A**mber **G**reen
Constructing and interpreting two-way tables, frequency tables and frequency trees	
Comparing relative frequencies to theoretical probabilities	
Finding probabilities from lists and tables	
Understanding the idea of relative frequency as an estimate of theoretical probability	
Understanding the concept of randomness	
Understanding and using the 0 – 1 probability scale	
Estimating probabilities using relative frequency	
Understanding and using the sum of the probabilities of mutually exclusive events (= 1)	
Understanding the benefit of conducting a greater number of trials in an experiment	
Completing tables to show outcomes of an event	
Completing tree diagrams to show outcomes and probabilities	
Constructing and interpreting Venn diagrams	
Understanding and using set notation used with reference to Venn diagrams	
Listing the outcomes to events in systematic ways	
Using and interpreting two-way tables	
Using and interpreting frequency trees	
Calculating probabilities from tables	
Calculating probabilities using the 'and' and 'or' rules	
Understanding whether two events are 'independent' or 'dependent'	
Using a tree diagram to calculate probabilities	
Calculating conditional probabilities using two-way tables	
Calculating conditional probabilities using tree diagrams	
Calculating conditional probabilities using Venn diagrams	

STATISTICS topics	Am I secure? **R**ed **A**mber **G**reen
Analysing sets of data for patterns and outliers	
Understanding the benefits and limitations of sampling	
Constructing and interpreting:	
frequency tables	
bar charts, vertical line charts and frequency diagrams	
pictograms	
pie charts	
time series graphs	
two-way tables	
cumulative frequency diagrams	
histograms with equal class intervals	
histograms with unequal class intervals	
Calculating the mean, median, mode and range for a list of data	
Estimating the mean, and finding the interval containing the median, of grouped data	
Comparing distributions of data sets using box plots	
Comparing distributions of data sets making use of quartiles and inter-quartile range	
Using the mean, median, mode and range, as well as diagrams to describe sets of data	
Using and interpreting scatter diagrams	
Recognising correlation and describing relationships from scatter diagrams	
Drawing lines of best fit and estimating unknown values	

SIGNPOSTING: If you need any help or support, try the following websites:

Videos and Worksheets – Corbettmaths

MathsWatch

Sparx Maths - Home

Maths Genie • Learn GCSE Maths for Free

ALL OF THESE TOPICS MAY APPEAR ON THE NON-CALCULATOR OR CALCULATOR PAPERS