GCSE
Grade
Skills
• Calculating bounds in area and volume questions
• Manipulating complex indices, including surds
• Solving simultaneous equations - one linear and one quadratic
• Using equation of a circle and finding points of intersection with a line
• Transforming graphs of trigonometrical functions
• Knowing graphs of exponential and more complex functions
• Manipulating algebraic fractions
• Rearranging complex equations
• Transforming graphical functions, e.g. \( y = f(x+a); y = f(ax) \)
• Solving 3D trigonometry problems
• Using the sine and cosine rule
• Mensuration in 3D solids and 2D shapes
• Knowing proofs of circle theorems
• Knowing proofs of construction theorems
• Rationalising surds
• Calculating upper and lower bounds
• Manipulating fractional indices
• Rearranging formulae where the variable occurs twice
• Manipulating simple algebraic fractions, e.g. \( \frac{1}{3} + \frac{1}{2x} - \frac{1}{6x} \)
• Solving algebraic problems, e.g. explain why \((n+1)(n+20)\) is an even number
• Solving quadratics by factorising, formula or completing the square
• Solving equations graphically
• Recognising the difference of two squares
• Simplifying algebra involving powers
• Calculating equation of line through a point and perpendicular to a given line
• Finding trigonometrical solutions, e.g. \( \cos x = 0.5 \)
• Recognising graphs of trigonometrical functions
• Using the sine and cosine rule in simple cases
• Calculating surface area or volume of various solids
• Solving problems involving arcs, sectors and segments
• Using Pythagoras’ Theorem in 3D situations
• Using similarity in length, area and volume
• Calculating the distance between points using 3D co-ordinates
• Proving that triangles are congruent
• Using circle theorems
• Carrying out an enlargement with a negative fractional scale factor
• Using the fact that the area of triangle = \( \frac{1}{2} \)absinC
• Constructing and interpreting histograms
• Understand stratified sampling
• Find probability for combined events using multiplication and addition
• Calculating compound interest
• Calculating reverse percentage problems
• Calculating with fractions and mixed numbers
• Calculating problems involving numbers in standard form
• Understanding negative indices
• Recognising the difference of 2 squares
• Solving inequalities by algebraic or graphical methods
• Solving simultaneous equations by graphical or algebraic methods
• Matching equations to their graphs
• Solving simple quadratics by factorising
• Solving equations involving fractions
• Expanding brackets
• Using \( y=mx+c \) to find the gradient and equation of a line without drawing
• Solving cubic equations graphically (when graph is given)
• Solving quadratic equations graphically
• Recognising graphs of cubic and reciprocal functions
• Simplifying fractions where the denominator is an algebraic expression
• Factorising expressions, e.g. \( 6(a-b)^2 - 3(a-b) \)
• Using circle theorems
• Understanding similar shapes
• Solving multi-stage trigonometrical problems
• Describing transformations
• Finding interior and exterior angles of polygons
• Finding dimensions of a formulae
• Using tree diagrams for probability
• Analysing data to compare with theoretical results
• Drawing box plots from a cumulative frequency table
• Finding median and inter-quartile range from cumulative frequency table or graph
• Estimation and division by a number less than 1
• Calculating compound interest - no rounding necessary
• Using a calculator in complex situations
• Multiplication and division by a number between 0 and 1
• Calculating with fractions
• Calculating with ratios
• Calculating percentage decrease and increase
• Multiplication and division by powers of 10 and decimals
• Finding the prime factor decomposition of a number
• Using the rules of indices in numeric situations
• Solving cubic equations by trial and improvement
• Rearranging simple formulae
• Solving equations
• Solving inequalities
• Expanding brackets and simplifying the result
• Graphing quadratic functions in simple cases
• Interpreting real-life graphs, e.g. travel graphs
• Finding the n\textsuperscript{th} term for a linear sequence
• Finding the length of a line given 2 points
• Substitution into complex formulae
• Constructing the perpendicular bisector of a given line
• Constructing loci
• Finding volumes of 3D shapes including prisms
• Calculating area or circumference of a circle from diameter
• Carry out transformations including translation with vectors
• Use of Pythagoras' Theorem and trigonometry
• Carrying out constructions, e.g. triangles in all situations
• Solving problems involving polygons, e.g. interior angles
• Understanding, using and solving problems with bearings
• Drawing box plots
• Calculating moving averages
• Finding mean and median from grouped data
• Designing questionnaires
• Explaining the use of different averages
- Estimation
- Calculating profit and loss
- Solving problems involving proportion in simple cases
- Calculating an increase or decrease by a percentage
- Calculating with fractions in simple cases
- Calculating with ratios in recipes
- Expanding brackets such as \( x(x+4) \)
- Factorising, e.g. \( x^2 - 5x \) and \( 12x - 8 \)
- Understanding unstructured linear graphs
- Deriving and solving equations from diagrams
- Substituting negative numbers into algebraic expressions
- Expanding and simplifying brackets and expressions
- Solving equations, including unknowns on both sides
- Converting between units of area, e.g. \( \text{m}^2 \) to \( \text{cm}^2 \)
- Calculating area or circumference of a circle given radius
- Finding area of triangle, regular polygons, compound shapes
- Drawing and measuring bearings
- Finding midpoint of a line given the end co-ordinates
- Carrying out simple transformations
- Solving simple problems involving polygons
- Solving problems involving similar triangles (+ve scale factor)
- Constructing and interpreting plans and elevations
- Solving problems involving parallel lines
- Knowing triangle proofs (exterior angle & angle-sum)
- Constructing a stem and leaf diagram
- Understanding and using relative frequency
- Finding missing probability from a list or table of results
- Constructing and interpreting scatter graphs
- Drawing and using lines of best fit
- Understanding correlation
- Finding the modal class from grouped frequencies
- Finding the mean from a discrete frequency distribution
- Explaining deficiencies in questionnaires and sampling techniques
- Simplifying ratios
- Using a calculator, e.g. '1·5³' and 'square root of 23·78'
- Rounding to 1 significant figure
- Calculating with fractions in simple cases
- Long multiplication and division, including decimals
- Finding percentages by mental methods
- Ordering fractions, decimals and percentages
- Calculating indices and roots, e.g. \(4^3, 2^3 \times 3^2\), 'the cube of 4'
- Using the four rules with negative numbers
- Calculating VAT
- Constructing simple linear graphs
- Simplifying simple algebra
- Using a formula inversely, e.g. find \(x\) if \(y=3\) where \(y = 2x-1\)
- Using conversion graphs
- Recognising complex number sequences
- Solving simple equations, e.g. \(3y + 2 = 8\)
- Understanding the geometry of triangles and quadrilaterals
- Measuring simple bearings
- Carrying out enlargements in simple cases
- Converting between metric and imperial units using known facts
- Calculating volumes in simple cases
- Completing tessellations
- Finding area and perimeter of rectangles and kites
- Identifying planes of symmetry
- Working with nets of shapes
- Constructing accurate drawings and angles
- Carrying out simple transformations
- Interpreting a stem and leaf diagram to find the median
- Interpreting a time series graph
- Using data collection sheets
- Finding probabilities from a 2-way table
- Using the fact that the sum of probabilities is 1
- Using ‘fx’ in a frequency table
- Constructing a pie chart
• Carrying out long multiplication and division: 3-digit by 2-digit
• Calculating simple percentages of quantities
• Calculating simple fractions of quantities
• Understanding the order of operations
• Rounding to various decimal places
• Understanding place value
• Finding simple squares, cubes and roots
• Finding factors of numbers
• Converting between fractions, decimals and percentages
• Using negative numbers in context
• Finding terms in a linear sequence
• Recognising non-linear number sequences
• Using co-ordinates in four quadrants
• Using simple formulae
• Solving simple equations, e.g. 5x = 25 and x - 2 = 6
• Deriving simple expressions
• Estimating lengths
• Using simple scale drawings
• Naming, measuring and drawing angles
• Naming polygons
• Identifying lines of symmetry
• Identifying rotational symmetry
• Using the angle sum on a straight line = 180°
• Identifying faces, edges and vertices
• Stating simple probability
• Listing all outcomes for a single event
• Estimating probability from diagrams, pie charts and tables
• Finding range, and using to compare two distributions
• Finding mean and mode
• Interpreting pie charts
• Using bar charts to compare two sets of data
• Rounding to the nearest integer
• Interpreting bills and timetables
• Rounding to the nearest 10,100, 1000
• Identifying fractions from a shaded diagram
• Identifying percentages from a shaded diagram
• Calculating simple fractions of quantities (numerator of 1)
• Ordering decimals
• Ordering, reading and writing whole numbers
• Converting fractions to a ratio, e.g. 1/3 of a whole is 1:2
• Using co-ordinates in one quadrant
• Reading from simple real-life graphs
• Finding the next term in a simple linear sequence
• Finding areas, perimeters and volumes by counting
• Drawing 2D shapes
• Measuring and drawing lines
• Drawing circles
• Naming shapes
• Drawing lines of symmetry on a diagram
• Using a given line of reflection
• Completing accurate drawings of given shapes
• Finding median and mode using single digits
• Drawing and interpreting line graphs, bar charts and pictograms
• Making tables, lists and tally charts from discrete data
• Being able to choose the 'most likely' outcome from given information