Mathematics Course Content
GCSE Higher

Topic 1	Calculations 1

- Order positive and negative integers and decimals
- Round to a given number of decimal places or significant figures
- Add, subtract, multiply and divide positive and negative integers and decimals
- Use BIDMAS

Topic 2	Expressions

- Simplify expressions by collecting like terms
- Use formulae
- Know the laws of indices
- Multiply out a bracket
- Factorise an expression using brackets
- Simplify algebraic fractions
- Carry out operations (+,-,x,/) with algebraic fractions

Topic 3	Angles and Polygons

- Use angle facts at a point and with parallel lines (vertically opposite/alternate/corresponding)
- Use bearings
- Identify congruent shapes
- Identify Similar shapes and use similarity to find lengths and areas
- Know the sum of external angles for any polygon
- Find the internal and external angles in any polygon

Topic 4	Handling Data 1

- Construct 2 way tables
- Construct and interpret pie charts
- Calculate mean, median and mode
- Calculate range and Interquartile range
- Find mean from a frequency table (grouped data)
- Construct a histogram

Topic 5	Fractions, Decimals and Percentages

- Find fractions and percentages of amounts
- Carry out operations (+,-,x,/) with fractions
- Convert fractions, decimals and percentages
- Convert fractions to percentages without a calculator
- Convert recurring decimals to fractions
- Order fractions, decimals and percentages

Topic 6	Formulae and Functions

- Rearrange formulae to change the subject
- Understand function notation
- Find the inverse of a function
- Construct a composite function
- Use and understand the terms expression, equation, formula, identify, inequality, term and factor
- Find proofs of simple statements using algebra
- Expand two brackets to form a quadratic expression
- Factorise a quadratic expression to brackets
- Understand what is meant by the difference of two squares

Topic 7	Working in 2D

- Measure angles accurately
- Use scale drawings
- Calculate the areas of triangles, parallelograms, trapeziums and composite shapes
- Transform and describe the transformation of shapes
  Reflections, Rotations, Translations (use 2D vectors)
  Enlargements (include fractional and negative scale factors)

Topic 8	Probability

- Find relative frequencies (use experimental data to estimate probability)
- Calculate probabilities
- Recognise mutually exclusive events and exhaustive events
  Know all mutually exclusive exhaustive events add up to 1.

Topic 9	Measures and Accuracy

- Use approximation to estimate calculations
- Convert between standard units of measurement
- Solve problems involving compound measures (Density/Speed)
- Find upper and Lower bounds of a rounded value
- Find upper and lower bounds of answers to calculations where the quantities have been rounded

Topic 10	Equations and Inequalities

- Solve linear equations
- Solve quadratic equations using factorisation, completing the square and the quadratic formula
- Solve a pair of linear simultaneous equations
- Solve a pair of simultaneous equations where one is quadratic
- Use iterative processes to find solutions
- Solve inequalities
- Show inequalities on a graph

Topic 11	Circles and Constructions

- Find the area and circumference of circles
- Find the lengths of arcs and the area of sectors
- Prove and apply circle theorems
- Construct and solve problems involving loci using compasses

Topic 12	Ratio and Proportion

- Divide a quantity in a given ratio
- Use scale factors
- Solve problems involving percentage change
  Compound Interest and reverse percentages

Topic 13	Factors, Powers and Roots

- Write a number as a product of its prime factors
- Find the HCF and LCM of a pair of integers
- Estimate the square and cube root of an integer
- Apply the laws of indices
- Simplify expressions involving surds
- Rationalise fractions involving surds

Topic 14	Graphs 1

- Find the gradient and y-intercept of a line and relate these to the equation y=mx+c
- Identify parallel and perpendicular lines by their equations
- Use two points to find the equation of a line
- Draw linear and quadratic graphs
- Identify roots, intercepts and turning points of quadratic curves
- Use graphs to solve problems involving distance, speed and acceleration

Topic 15	Working in 3D

- Draw and interpret plans and elevations of 3D shapes
- Calculate the volume of cuboids, prisms and cylinders
- Calculate the surface area of cuboids, prisms and cylinders
- Calculate the surface area and volume of spheres, pyramids and cones
- Know the relationship between the lengths, areas and volumes of similar shapes

Topic 16	Handling Data 2

- Calculate statistics from a grouped frequency table
- Construct cumulative frequency graph and box plots
- Plot scatter graphs and recognise correlation
- Use graphs to represent time series data

Topic 17	Calculations 2

- Perform calculations involving indices
- Use negative and fractional indices
- Perform exact calculations involving surds
- Work with numbers in standard form

Topic 18	Graphs 2

- Recognise and draw graphs of cubic and reciprocal functions
- Recognise and draw graphs of exponential functions
- Recognise and sketch graphs of trigonometric functions
- Recognise and sketch translations and reflections of graphs
- Approximate the gradient of a curve at a given point and the area under a curve. Understand the use of these facts on kinematic graphs.
- Find the equation to a circle

Topic 19	Pythagoras and Trigonometry

- Use Pythagoras' theorem to find the missing side of a right angled triangle
- Use trigonometry to find the missing lengths and angles in right angled triangles
- Find the exact values of sin x and cos x for key angles 0º, 30º, 45º, 60º, 90º
- Use the Sine rule
- Use the Cosine rule
- Use Area of triangle = 0.5abSinC
- Do calculations with vectors
- Use vectors in geometric proofs

Topic 20	Probability of combined events

- Use Venn diagrams to represent sets
- Use possibility space to represent outcomes to two events and calculate probabilities
- Use a tree diagram to show outcomes of two or more events and calculate probabilities
- Calculate conditional probabilities

Topic 21	Sequences

- Generate a sequence using a term to term rule
- Generate a sequence using a position to term rule
- Recognise a linear sequence and find a formula for the nth term
- Recognise a quadratic sequence and find a formula for the nth term

Topic 22	Proportionality

- Solve direct proportion problems
- Solve inverse proportion problems
- Describe direct and inverse proportion relationships using an equation
- Recognise graphs of direct and inverse proportion
- Find an approximation to the gradient of a curve on a graph
- Understand how the gradient of the curve relates to the rate of change