Year 10 Mathematics Scheme of Work

Higher and Foundation

Tiers

- Sets 1 and 2 will do the Higher specification.
- Sets 3 and 4 will do the Higher specification but with a focus on the topics that overlap Higher and Foundation (it will be up to teacher discretion in regard to non-overlap Higher topics).
- Sets 5 and 6 will do the Foundation specification.

Route map

Winter term

Spring term

Summer term

Useful links

Need to know formulae (Foundation)

Need to know formulae (Higher)

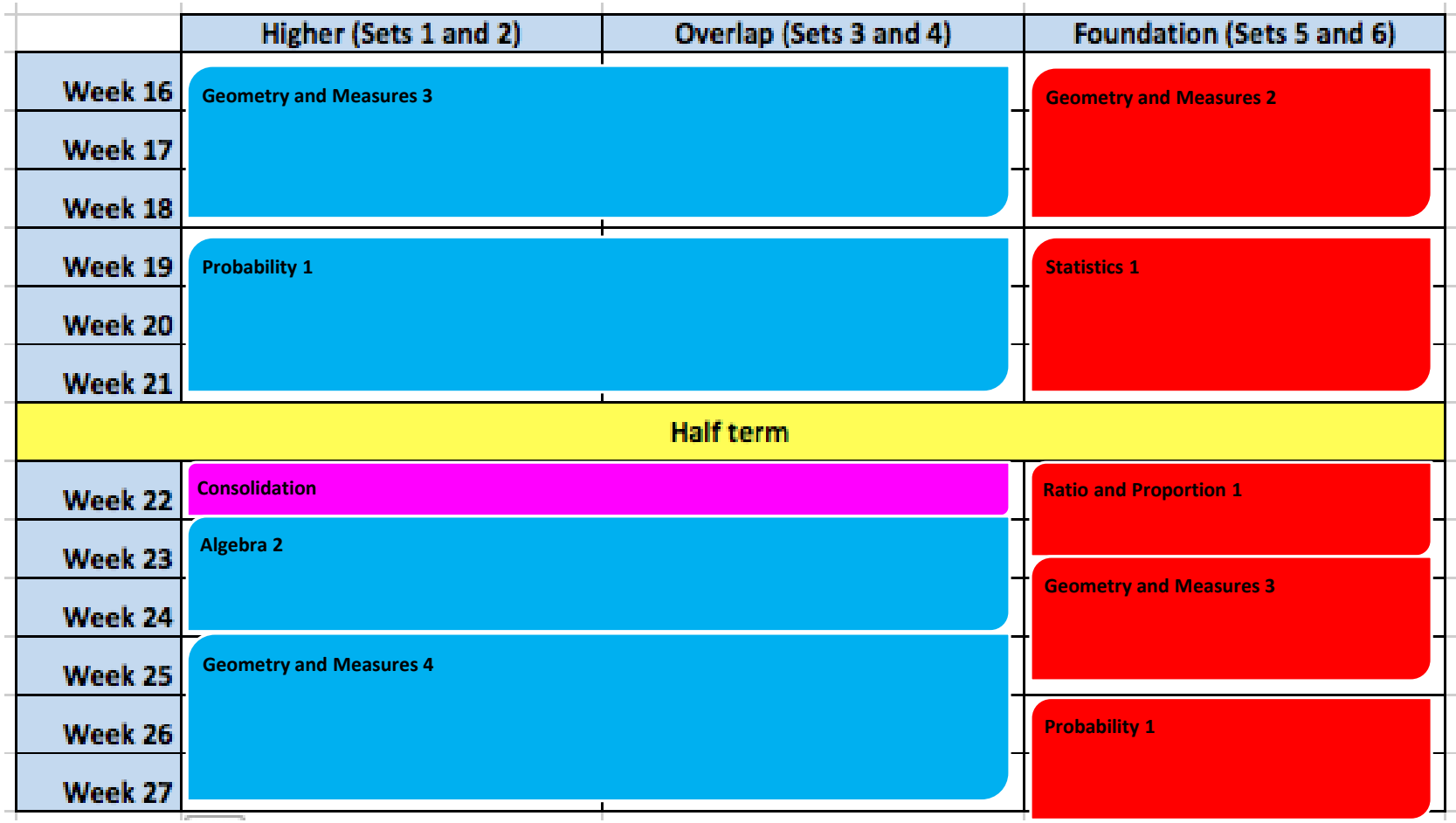
* Text that is underlined is on the Higher specification only.

Return to route map

Winter term

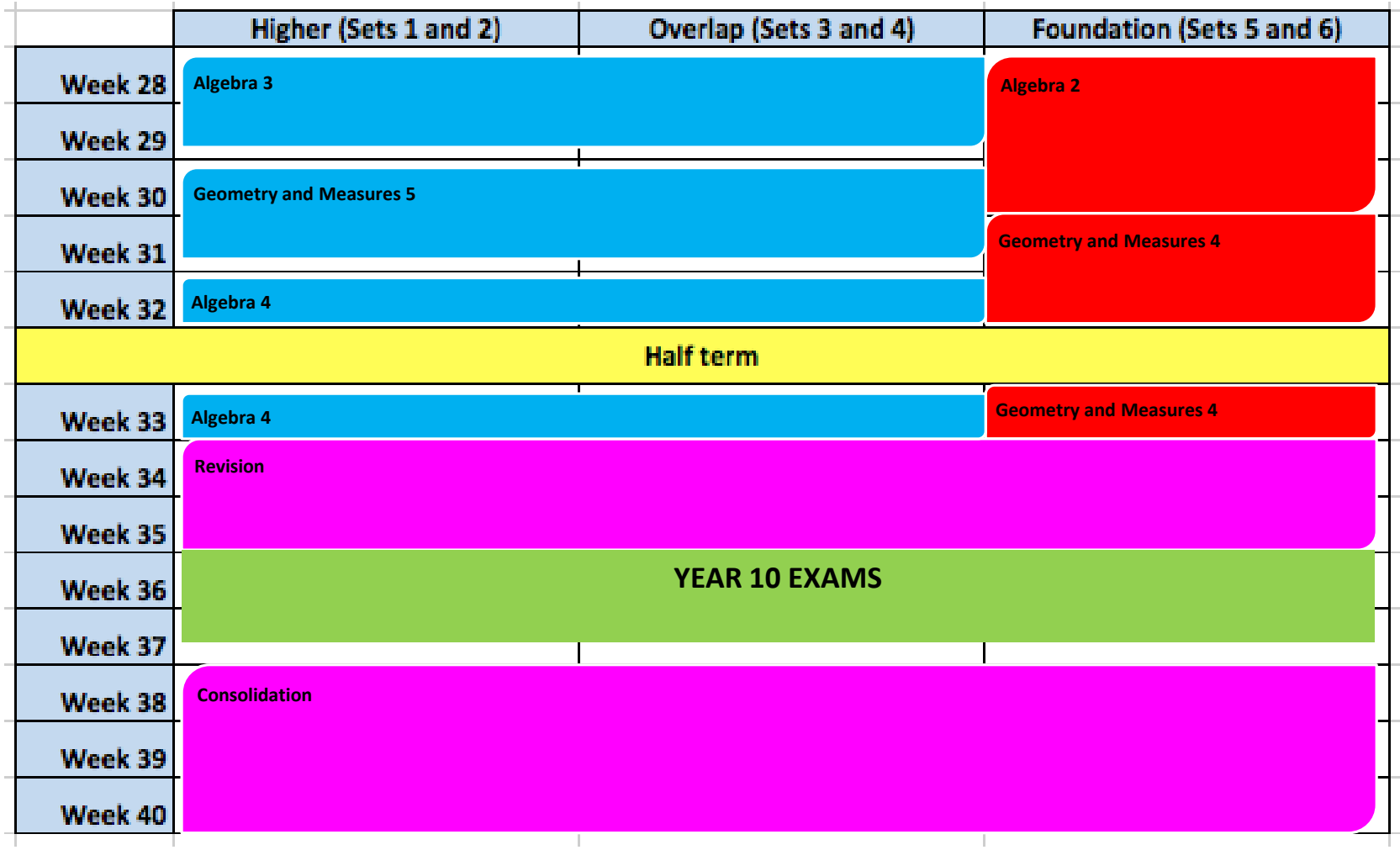
Spring term

Return to route map



Return to route map

Summer term



Return to Winter term

Number 1 – Basic number skills

- Addition and subtraction (integers, decimals, negative numbers)
- Multiplication and division (integers, decimals, negative numbers)
- Ordering numbers/decimals/fractions in ascending and descending order
- Rational and irrational numbers
- Order of operations (BIDMAS)
- Rounding to the nearest 10, 100, etc and rounding to significant figures and decimal places
- Estimating/approximating answers to calculations
- Apply and interpret limits of accuracy

Return to Winter term

Geometry and Measure 1 - Angles

- Estimating the size of an angle
- Measuring and drawing angles
- Describing angles as clockwise or anticlockwise turns
- Understand angle rules – angles around a point, angles on a straight line, vertically opposite angles, angles in a triangle and angles in a quadrilateral
- Angles in special quadrilaterals (square, rectangle, parallelogram, trapezium, kite, rhombus)
- Angles in parallel lines – reference to alternate, corresponding and supplementary
- Finding the sum of the interior angles in any polygon and knowing the sum of the exterior angles of any polygon
- Finding an interior and exterior angle of a regular polygon
- Understand how certain polygons fit together (reference to angles must be made)
- Symmetry and rotational symmetry

Return to Winter term

Number 2 – Fractions, decimals and percentages

- Recognise a shaded fraction of a shape and shade a fraction of a shape
- Convert between fractions, decimals and percentages
- Convert between improper fractions and mixed numbers
- Recognise and simplify equivalent fractions
- Add and subtract fractions (same and different denominators)
- Multiply and divide fractions (including mixed numbers)
- Express one value as a percentage or fraction of another
- Find a percentage of a quantity without a calculator
- Percentage increase and decrease
- Percentage change
- Find a percentage of an amount using a multiplier, and understand what a multiplier is
- Simple interest
- Reverse percentages
- Growth and decay problems including compound interest

Return to Winter term

Number 3 – Factors, multiples, primes, standard form

- Factors and multiples
- Prime numbers, square numbers, cube numbers
- Prime factorisation
- Finding the LCM and HCF
- Laws of indices and applying laws of indices to numerical values
- Standard form – converting between ordinary numbers and standard form
- Calculating with numbers given in standard form – addition, subtraction, multiplication and division

Return to Winter term

Algebra 1 – Expressions, equations, inequalities

- Write out an expression from a context
- Be able to recognise an expression/equation/formula/identity
- Simplify algebraic expressions
- Expanding single and double brackets
- Factorising quadratics where the coefficient of x squared is 1 and solving equal to 0
- Substituting values into a formula, expression or equation
- Solving equations, including those with an unknown on each side and brackets
- Setting up linear equations and solving them
- Rearranging formulae
- Understanding inequality notation
- Solving linear inequalities
- Representing linear inequalities on a number line

Return to Spring term

Geometry and Measure 2 – units, area, perimeter

- Reading scales
- Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money etc)
- Converting metric units (length, mass, volume)
- Estimating the length, mass and volume of real things
- Converting units of area and volume
- Area and perimeter of irregular and compound shapes
- Area and perimeter of squares and rectangles
- Area of a triangle
- Area of a parallelogram
- Area of a trapezium
- Drawing circles given the radius or diameter
- Area and circumference of circles
- Area, angle and arc length of a sector

Return to Spring term

Statistics 1 – averages, representing and analysing data

- Understand what is meant by a sample and a population
- Understand the limitations of sampling with some reference to stratified sampling
- Data collection sheets and questionnaires
- Finding the mode, median, mean and range from a data list
- Finding the mode, median and mean from a discrete frequency table
- Finding the estimated mean and modal class from a continuous (grouped) frequency table
- Bar charts and pictograms – draw and interpret
- Scatter graphs – draw and interpret, draw a line of best fit, correlation, interpolation and extrapolation)
- Frequency polygons – draw and interpret
- Pie charts – draw and interpret
- Time series graphs – draw and interpret
- Two way tables – draw and interpret
- Stem and leaf diagrams (including back to back) – draw and interpret, find the mode, median, mean and range

Return to Spring term

Ratio and Proportion 1 – ratio, direct and inverse proportion

- Write a ratio given a context
- Simplify a ratio
- Write ratios in the form 1 : n and m : 1
- Express a ratio as a fraction
- Divide amounts into a given ratio
- Complete more challenging ratio questions where only some of the information is given
- Direct proportion
- Inverse proportion (not algebraically) – see CGP book for examples
- Best buys

Return to Spring term

Geometry and Measure 3 – scale, constructions, bearings, loci

- Scale drawings
- Plans and elevations
- Nets of 3D shapes
- Bearings, drawings and measuring problems
- Constructing triangles
- Constructions – perpendicular bisector, angle bisector, perpendicular from a point, parallel lines, constructing 90, 60, 45 and 30 degree angles
- Loci

Return to Spring term

Probability 1

- Use probability language to describe the probability of certain events
- Use a probability scale between 0 and 1
- Calculate probabilities
- Use frequency trees to analyse frequency outcomes of probability experiments
- Expectation
- Listing possible outcomes (sample space) eg. When two dice are thrown, when one die and a coin are thrown etc. Use Venn diagrams where possible.
- Use and/or rules
- Calculate probabilities from two way tables
- Relative frequency and experimental probability

Return to Summer term

Algebra 2 – coordinates and graphs

- Plot and identify coordinates in all four quadrants
- Identify and draw horizontal and vertical lines
- Understand y = mx + c (where m is the gradient and c is the y intercept)
- Plot and draw lines in the format y = mx + c using a table of values
- Find the gradient and y intercept of a linear graph
- Draw the line y = mx + c using the gradient and y intercept
- Plot and draw lines in the form ax + by = c
- Find the equation of a line by finding the gradient and y intercept
- Find the equation of a line given one point and its gradient
- Find the equation of a line through two points
- Find approximate solutions to linear equations from a graph
- Identify parallel lines from their equation
- Plot quadratic graphs from a table of values
- Cubic and reciprocal graphs – identify, and plot and draw

Return to Summer term

Geometry and Measure 4 – speed, density, pressure and graphs

- Speed, distance and time calculations
- Density, mass and volume calculations
- Pressure, area and force calculations
- Draw and interpret distance time and velocity time graphs
- Draw and interpret real life graphs (e.g. conversion graphs)

Return to Winter term

Number 1 – Basic skills

- Multiplying and dividing decimals.
- Rounding to certain decimal places and significant figures.
- Estimating/Approximating answers to calculations.
- Adding, subtracting, multiplying and dividing negative numbers.
- Prime Numbers, Square numbers, Cube Numbers and Square roots
- Prime factorisations.
- Finding HCF and LCM.
- Powers, understand the laws of indices.
- Powers, be able to apply certain indices to whole numbers including those that are negative and fractional.
- Standard form, writing numbers in standard form and changing numbers back from standard form into ordinary form.
- Multiplying and dividing numbers in standard form.
- Adding and subtracting numbers in standard form.

Return to Winter term

Geometry and Measure 1 - Angles

- Understand angles rules; angles around a point, angles on a straight line, angles in a triangle and angles in a quadrilateral.
- Angles in special quadrilaterals.
- Angles in parallel lines, with specific reference to alternate, corresponding and supplementary.
- Understand how to find sum of interior angles in various different polygons.
- Find interior and exterior angles in regular polygons.
- Understand how certain polygons fit together, reference to the angles must be made here.
- Circle Theorems, including cyclic quadrilaterals, tangents, cords and alternate segment theorem.

Return to Winter term

Number 2 – Fractions, decimals and percentages

- Add and subtract fractions with both the same denominator and where denominators are not the same.
- Multiplying and dividing fractions, including questions with mixed numbers or improper fractions.
- Express one value as a percentage of another.
- Find a percentage of a quantity without a calculator; these must include 50%, 25%, 5%, 10% and any multiple of 5% and 10%.
- Calculate percentage increase and decrease.
- Calculate percentage change.
- Understand what a multiplier is.
- Find a percentage of a quantity using a multiplier.
- Use the multiplier to solve compound interest problems.
- Understand growth and decay problems.
- Reverse percentages.
- Change between fractions, decimals and percentages.
- Change recurring decimals to fractions.

Return to Winter term

Algebra 1 – Expressions, equations, inequalities

- Write out an expression.
- Be able to recognise an expression/equation/formula/identity.
- Simplify algebraic expressions.
- Expanding brackets, one term over a bracket, double brackets, and more than 2 binomials.
- Factorise quadratics including those of the form x^2+bx+c and ax^2+bx+c
- Substitute values into a formula.
- Solve equations, including those with brackets and unknowns on both sides.
- Setting up equations and then solving.
- Rearranging the subject of the formula.
- Solve linear inequalities.
- Represent linear inequalities on a number line.

Return to Winter term

Geometry and Measures 2 – Area and volume

- Converting metric units (including length, mass and volume).
- Converting units, for area and volume.
- Area and Perimeter of irregular/compound shapes.
- Area of a Trapezium.
- Area and Circumference of circles.
- Area of sector and arc length.
- Find the surface area and volume of cubes and cuboids.
- Find the surface area and volume of cylinders.
- Find the surface area and volume of triangular prisms.
- Find the surface area and volume of prisms
- Find the surface area and volume of composite shapes.
- Find the surface area and volume of a sphere.
- Find the surface area and volume of a pyramid.
- Find the surface area and volume of cone.

Return to Winter term

Statistics 1 – Representing and analysing data

- Understand what is meant by a sample and population; also understand the limitations of sampling, with some reference to the benefits of stratified sampling.
- Find a stratified sample.
- Finding the mode, mean and median for a frequency table.
- Finding an estimate of the mean from a grouped frequency table, and find the modal class.
- Draw and interpret a scatter graph, (including lines of best fit, correlation, interpolate and extrapolate).
- Draw and interpret frequency polygons.
- Draw and interpret time series graphs.
- Draw and interpret pie charts.
- Two way tables.
- Draw a stem and leaf diagram (including a back-to-back stem and leaf).
- Find mode, mean, median and range from a stem and leaf diagram.
- Draw and interpret cumulative frequency graphs.
- Draw and interpret boxplots.
- Draw and interpret histograms.

Return to Winter term

Ratio and Proportion 1 – Ratio, direct and inverse proportion

- Write ratios in the form 1:n or m:1.
- Divide amounts into given ratios.
- Complete more difficult ratio questions where only part of the information is give.
- Best buys.
- Direct proportion problems.
- Inverse proportion problems

Return to Spring term

Probability 1 – Independent and conditional

- Calculate probabilities.
- Expectation
- Listing outcomes, including those where two dice are thrown, or a die and a coin is tossed etc. Use Venn diagrams where possible.
- Use of the and/or rule.
- Use of two way tables to calculate certain probabilities.
- Relative frequency/Experimental probability.
- Understand union and intersection notation.
- Calculate and interpret conditional probabilities through Venn diagrams, tree diagrams and two way tables.
- Find the probability of successive events.
- Use tree diagrams to calculate probability of two independent and dependent events.

Return to Spring term

Geometry and Measures 3 – Bearings, construction and loci

- Symmetry and rotational symmetry.
- Congruent shapes.
- Scale Drawings.
- Plans and elevations.
- Nets of shapes.
- Bearing, drawings and measuring problems.
- Constructing triangles.
- Constructions – perpendicular bisector, angle bisector, perpendicular from a point, parallel lines and constructing 90, 60, 45 and 30 degree angles.
- Drawing Loci.

Return to Spring term

Algebra 2 – Coordinates and graphs

- Plot co-ordinates in all four quadrants and identify already drawn points.
- Identify and draw vertical and horizontal lines.
- Understand the general format of a straight line is y=mx + c, where m is the gradient and c is the y-intercept.
- Plot and draw the line y=mx + c using a table of values.
- Find the Gradient and y-intercept of any line.
- Draw the line y=mx + c using the gradient and y-intercept.
- Plot and draw lines in the form ax +by = c
- Find the equation of a line, by finding the gradient and y intercept.
- Find the equation of a line through one point and a given gradient.
- Find the equation of a line given two points.
- Find the approximate solutions to a linear equation from a graph.
- Identify and sketch parallel and perpendicular lines.
- Plot quadratic graphs from a table of values.
- Find solutions by using points of intersection of two lines, or one line and a curve.
- Identify cubic and reciprocal graphs.
- Plot and draw a cubic and reciprocal graph.
- Plot and draw exponential graphs.

Return to Spring term

Geometry and Measure 4 – Speed, density and pressure

- Speed, distance and time calculations.
- Solve problems where kinematic formulae are used.
- Density, mass and volume calculations.
- Pressure, force and area calculations.
- Draw and interpret distance time graphs and velocity time graphs.
- Draw and interpret real-life graphs (conversion graphs etc).

Return to Summer term

Algebra 3 – Quadratic graphs

- Find solutions to quadratic graphs using factorisation, using quadratic formula and completing the square.
- Revise how to sketch and plot quadratic graphs.
- Draw quadratic graphs using factorisation.
- Find minimum and maximum points of quadratics using graphs and completing the square.
- Deduce turning points by completing the square.

Return to Summer term

Geometry and Measure 5 – Pythagoras and trigonometry

- Use Pythagoras theorem to find the shorter or longest side.
- Pythagoras in 3D shapes.
- Basic trigonometry in right angled triangles, SOHCAHTOA, finding missing lengths and angles.

Return to Summer term

Algebra 4 – Simultaneous equations and inequalities

- Solve simultaneous equations algebraically including one which is quadratic or a circle.
- Solve simultaneous equations graphically.
- Draw linear inequality on a graph, and shade the appropriate region.
- Draw a set on inequalities on a graph where pupils are asked to shade the region that satisfies them all.

Return to route map

Need to know formulae (Foundation):

- Area of a rectangle
- Area of a parallelogram
- Area of a circle
- Circumference of a circle
- Volume of a cuboid
- Volume of a prism
- Volume of a cylinder
- Pythagoras' theorem
- Trigonometric ratios
- Speed
- Density
- Pressure

The full formula sheet can be found here:
https://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/misc/gcse-maths-formulae-sheet-a5.pdf

Return to route map

Need to know formulae (Higher):

- Area of a rectangle
- Area of a parallelogram
- Area of a circle
- Circumference of a circle
- Volume of a cuboid
- Volume of a prism
- Volume of a cylinder
- Pythagoras' theorem
- Trigonometric ratios
- Speed
- Density
- Pressure
- The Quadratic Equation
- Sine rule
- Cosine rule
- Area of a non-right angled triangle

The full formulae sheet can be found here:
https://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/misc/gcse-maths-formulae-sheet-a5.pdf

Return to route map

Useful links:

- Link to the full Pearson specification: http://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/specification-and-sample-assesment/gcse-maths-2015-specification.pdf

- Link to the guide to assessment: http://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/specification-and-sample-assesment/gcse-9-1-mathematics-assessment-guide.pdf

- Link to course materials: http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments