

KS4

# Mathematics

## **Exam Details:**

Exam Board: Edexcel

Exam consists of three papers: Paper 1:

Non-Calculator

(1hr 30mins)

Paper 2: Calculator

(1hr 30mins)

Paper 3: Calculator

(1hr 30mins)

*All topics will be on all three papers*

Students will either be entered for -

Foundation Paper (grades 1-5) or

Higher Paper (grades 3-9)

*Excellence Together*



# GCSE Maths Revision Checklist - Foundation

Unit	Unit / Topic	Complete
1	<b>Integers and place value</b> Types of number Use and order positive and negative numbers Use inequality symbols Four operations using positive and negative numbers Round numbers to nearest 10, 100, 1000 and use rounding for estimation	
	<b>Decimals</b> Use decimals and place value Compare and order decimal numbers Four operations using decimal numbers Round to nearest whole number, decimal place & significant figures Use one calculation to check another	
	<b>Indices, powers and roots</b> Find squares and cubes Use index notation including negative powers Use laws of indices to multiply and divide numbers in index form Order of operations including powers and brackets Use of calculator	
	<b>Factors, multiples and primes</b> Identify factors, multiples and prime numbers Find prime factorisation of a number (& write in index form) Find common factors & highest common factor Find LCM of two (or three) numbers	
2	<b>Algebra: the basics</b> Write an expression Collect like terms Simplify expressions Use index laws	
	<b>Expanding and factorising single brackets</b> Expand single brackets Simplify expressions using squares and cubes Factorise expressions	
	<b>Expressions and substitution into formulae</b> Substitute into expressions involving brackets & powers Substitute into a formula (& word formula)	
3	<b>Tables</b> Sort and classify data (inc tally charts) Extract data from lists and tables (inc timetables) Identify mode from a list / table	
	<b>Charts and graphs</b> Know which chart or diagram to use for different data sets Draw and interpret bar charts (inc dual & composite) Draw and interpret line graphs (vertical & time-series) Draw and interpret frequency polygons Draw and interpret pictograms Draw and interpret stem and leaf diagrams	
	<b>Pie charts</b> Draw and use pie charts Find mode & total frequency from a pie chart Compare two pie charts	
	<b>Scatter graphs</b> Draw and use scatter graphs & lines of best fit Identify outliers & correlation	

Unit	Unit / Topic	Complete
4	<b>Fractions</b> Equivalent fractions including simplifying & comparing Express one amount as a fraction of another Convert between mixed numbers and improper fractions Four operations using fractions Find a fraction of an amount	
	<b>Fractions, decimals and percentages</b> Use fraction to decimal conversions Recognise terminating & recurring decimals	
	<b>Percentages</b> Convert between fractions, decimals & percentages Order & compare fractions, decimals & percentages Write one amount as a percentage of another Calculate percentage of an amount Calculate percentage increase/decrease Use decimals to find quantities (multiplier methods) Increase / decrease an amount by a percentage	
5	<b>Equations</b> Use function machines Solve equations (inc brackets and unknowns on both sides) Rearrange simple equations Set up & solve equations to solve problems	
	<b>Inequalities</b> On a number line Listing numbers that satisfy an inequality Solving inequalities and show the solution on a number line Error intervals due to rounding & truncation	
	<b>Sequences</b> Continue sequences inc from pictures Find the nth term Use nth term rule to generate or continue a sequence	
6	<b>Properties of shapes, parallel lines and angle facts</b> Measure and draw lines, angles, 2D & 3D shapes Identify and name 2D shapes and their properties Identify parallel and perpendicular lines Use angle facts - around a point, straight line, vertically opposite etc Use angle properties of parallel lines	
	<b>Interior and exterior angles of polygons</b> Use sum of interior angles for irregular & regular polygons Use sum of exterior angles for regular polygons	
7	<b>Statistics and sampling</b> Understand bias	
	<b>The averages</b> Use various charts & diagrams in relation to averages Calculate the mean, mode, median and range from a list Median, mean and range from a table (discrete data) Modal class, median and estimate of the mean from grouped data	
8	<b>Perimeter and area</b> Convert between metric measures Read scales Time Perimeter of 2D shapes Area of 2 D shapes Area of compound shapes Surface area of prisms & simple compound forms	



# GCSE Maths Revision Checklist - Foundation

Unit	Unit / Topic	Complete
8	<b>3D forms and volume</b> Identify and name 3D forms and their properties Volume of a cuboid Volume of a prism Volume of a composite forms	
9	<b>Real-life graphs</b> Use coordinates in all four quadrants Midpoints of a line segment Conversion graphs Fixed cost and cost per unit graphs Distance / time and Velocity/ time graphs	
10	<b>Straight-line graphs</b> Draw, use and interpret (inc gradient) straight line graphs Identify parallel lines Find the equation of a line (including from a graph)	
11	<b>Transformations I: translations, rotations &amp; reflections</b> Transform and describe translations Transform and describe rotations Transform and describe reflections	
12	<b>Transformations II: enlargements and combinations</b> Transform and describe enlargements Transform shapes using a combination of transformations Describe transformations when using multiple transformations	
13	<b>Ratio</b> Write ratios in their simplest form (including in context) Share a quantity in a given ratio (including 3-part ratios) Use a ratio to find one quantity when another is known Compare ratios Write ratio in the form 1:n or n:1 Write a ratio as a fraction and vice versa	
14	<b>Proportion</b> Use direct & inverse proportion (and recognise graphically) Best value Recipes Currency conversions	
15	<b>Right-angled triangles: Pythagoras and trigonometry</b> Pythagoras' Theorem Trigonometry - sin, cos and tan Know exact trig values	
16	<b>Probability I</b> Probability scale Listing outcomes Two-way tables & Frequency Trees Use 1-p	
17	<b>Probability II</b> Relative frequency Sample space diagrams Venn diagrams & set notation Probability tree diagrams	

Unit	Unit / Topic	Complete
14	<b>Multiplicative reasoning</b> Use compound measures: Pressure, Density & Speed Percentage profit / loss Reverse percentages Simple interest Compound interest & growth Depreciation & decay Rates of pay	
15	<b>Plans and elevations</b> 3D shape names and properties Sketch 3D forms Draw plans and elevations of shapes Draw a 3D form given its plan and elevations	
16	<b>Constructions, loci and bearings</b> Standard constructions Find regions satisfying a combination of loci Use maps and scale drawings Bearings	
17	<b>Quadratic equations: expanding and factorising</b> Expand double brackets Factorise quadratic expressions Solve quadratic equations	
18	<b>Quadratic equations: graphs</b> Plot quadratic graphs Find solutions, intercepts & turning points of a quadratic graph	
19	<b>Circles, cylinders, cones and spheres</b> Name parts of a circle Recall & use formula for area and circumference of a circle Arcs and sectors Surface area & volume of a cylinder Spheres, pyramids, cones and composite solids.	
20	<b>Fractions and reciprocals</b> Four operations with mixed number fractions Reciprocal of an integer, decimal or fractions	
21	<b>Indices and standard form</b> Index laws to simplify & calculate the value of an expression Convert between ordinary numbers and standard form Work with the four operations in standard form Use a calculator with indices and standard form	
22	<b>Similarity and congruence in 2D</b> Use congruence criteria for triangles (SSS, SAS, ASA and RHS); Identify similar shapes Identify scale factors and find missing lengths in similar shapes	
23	<b>Vectors</b> Understand and use column notation including drawing them Identify parallel column vectors Calculate using column vectors	
24	<b>Rearranging equations, graphs of cubic and reciprocal functions and simultaneous equations</b> Know the terms equation, identity, expression etc Change the subject of a formula Answer simple "show that" questions. Use inverse proportion involving graphs Recognise and sketch cubic functions Recognise and sketch reciprocal functions Solve simultaneous equations algebraically and graphically	



# GCSE Maths Revision Checklist - Higher

Unit	Unit / Topic	Complete
1	<b>Calculations, checking and rounding</b> Four operations with decimals and whole numbers Use one calculation to find the answer to another Product rule Rounding & estimation	
	<b>Indices, roots, reciprocals and hierarchy of operations</b> Use index notation including fractional and negative powers Order of operations	
	<b>Factors, multiples and primes</b> Identify factors, multiples and prime numbers Find prime factorisation of a number (& write in index form) Find common factors & highest common factors Find LCM of two (or three) numbers	
	<b>Standard form and surds</b> Index laws to simplify & calculate the value of an expression Convert between ordinary numbers and standard form Work with the four operations in standard form Use a calculator with indices and standard form Simplify surd expressions	
2	<b>Algebra: the basics</b> Write an expression Collect like terms Simplify expressions Use index laws Expand single & double brackets Factorise single brackets Factorise quadratic expressions Factorise quadratic expressions using difference of two squares	
	<b>Setting up, rearranging and solving equations</b> Set up expressions and equations Substitute into expressions, equations and formulae Solve linear equations and inequalities Change the subject of a formula Iteration	
	<b>Sequences</b> Continue sequences inc from pictures Find the nth term Use nth term rule to generate or continue a sequence Find the nth term of a quadratic sequence Distinguish between arithmetic and geometric sequences Recognise and use simple geometric progressions Find term to term rule of a geometric sequence, including negative, fraction and decimal terms	
3	<b>Averages and range</b> Use various charts & diagrams in relation to averages Two way tables Calculate the mean, mode, median and range from a list Median, mean and range from a table (discrete data) Modal class, median and estimate of the mean from grouped data Draw and interpret stem and leaf diagrams	
	<b>Representing and interpreting data</b> Know which chart or diagram to use for different data sets Draw and interpret bar charts (inc dual & composite) Draw and interpret line graphs (vertical & time-series)	
	Draw and use pie charts Find mode & total frequency from a pie chart Compare two pie charts Produce and interpret histograms Compare distributions	
	<b>Scatter graphs</b> Draw and use scatter graphs & lines of best fit Identify outliers & correlation	

Unit	Unit / Topic	Complete
4	<b>Fractions</b> Equivalent fractions including simplifying & comparing Express one amount as a fraction of another Convert between mixed numbers and improper fractions Four operations using fractions Find a fraction of an amount Convert between recurring decimals to fractions and vice versa	
	<b>Percentages</b> Use fraction to decimal conversions Recognise terminating & recurring decimals Convert between fractions, decimals & percentages Order & compare fractions, decimals & percentages Write one amount as a percentage of another Calculate percentage of an amount Calculate percentage increase/decrease Use decimals to find quantities (multiplier methods) Increase / decrease an amount by a percentage Reverse percentages	
5	<b>Ratio and proportion</b> Write ratios in their simplest form (including in context) Share a quantity in a given ratio (including 3-part ratios) Use a ratio to find one quantity when another is known Compare ratios Write ratio in the form 1:n or n:1 Write a ratio as a fraction and vice versa Write a ratio as a linear function Use direct & inverse proportion (and recognise graphically) Recipes Currency conversions	
	<b>Polygons, angles and parallel lines</b> Measure and draw lines, angles, 2D & 3D shapes Identify and name 2D shapes and their properties Identify parallel and perpendicular lines Use angle facts - around a point, straight line, vertically opposite etc Use angle properties of parallel lines Use sum of interior angles for irregular & regular polygons Use sum of exterior angles for regular polygons Use the side/angle properties of compound shapes made up of triangles, lines and quadrilaterals	
6	<b>Pythagoras' Theorem and trigonometry</b> Pythagoras' Theorem Trigonometry - sin, cos and tan Know exact trig values	
	<b>Graphs: the basics and real-life graphs</b> Use coordinates in all four quadrants Conversion graphs Fixed cost and cost per unit graphs Distance / time and Velocity/ time graphs Midpoints of a line segment Calculate the length of a line segment	
7	<b>Linear graphs and coordinate geometry</b> Draw, use and interpret (inc gradient) straight line graphs Find the equation of a line through two points Find the equation of a line (including from a graph) Identify parallel and perpendicular lines Generate equations of parallel and perpendicular lines	
	<b>Quadratic, cubic and other graphs</b> Plot quadratic graphs Find solutions, intercepts & turning points of a quadratic graph Recognise and sketch cubic functions Recognise and sketch reciprocal functions Draw circles, centre the origin, equation $x^2 + y^2 = r^2$ .	



# GCSE Maths Revision Checklist - Higher

Unit	Unit / Topic	Complete
7	<b>Perimeter, area and circles</b> Convert between metric measures Read scales Perimeter of 2D shapes Area of 2 D shapes and compound shapes Name parts of a circle Recall & use formula for area and circumference of a circle Arcs and sectors	
	<b>3D forms and volume, cylinders, cones and spheres</b> Identify and name 3D forms and their properties Volume of a cuboid Volume of a prism Volume of a composite forms Surface area of prisms & simple compound forms Surface area & volume of a cylinder Spheres, pyramids, cones, frustums and composite solids.	
	<b>Accuracy and bounds</b> Calculate the upper & lower bounds of numbers Calculate the upper & lower bounds of an expression Use error intervals (inc truncation)	
8	<b>Transformations</b> Transform and describe translations, rotations & reflections Transform and describe enlargements inc fractional and negative SF Transform shapes using a combination of transformations Describe transformations when using multiple transformations Describe the changes & invariance achieved by combinations of transformations	
	<b>Constructions, loci and bearings</b> Draw plans and elevations of shapes Draw a 3D form given its plan and elevations Use maps, scale drawings & bearings Standard constructions Find regions satisfying a combination of loci Find and describe regions satisfying a combination of loci, including in 3D Use constructions to solve loci problems including with bearings	
9	<b>Solving quadratic and simultaneous equations</b> Set up and solve quadratic equations Completing the square Quadratic Formula Solve simultaneous equations algebraically and graphically (linear/linear) Solve simultaneous equations algebraically and graphically (linear/quadratic) Solve simultaneous equations algebraically and graphically (linear/circle)	
	<b>Inequalities</b> On a number line Listing numbers that satisfy an inequality Solving inequalities and show the solution on a number line Represent and interpret inequalities graphically	
10	<b>Probability</b> Probability scale Listing outcomes Two-way tables Frequency trees Use 1-p Relative frequency Sample space diagrams Venn diagrams & set notation Probability tree diagrams	
11	<b>Multiplicative reasoning</b> Best value Use compound measures: Pressure, Density & Speed Percentage profit / loss Reverse percentages Simple interest Compound interest & growth Depreciation & decay Rates of pay	

Unit	Unit / Topic	Complete
12	<b>Similarity and congruence in 2D and 3D</b> Use congruence criteria for triangles (SSS, SAS, ASA and RHS); Use formal geometric proof involving similarity & congruence Identify similar shapes Identify scale factors and find missing lengths in similar shapes Use length, area and volume scale factors Area and surface area of frustums	
13	<b>Graphs of trigonometric functions</b> Recognise, sketch and interpret graphs of the trigonometric functions Exact trig values Transforming graphical functions	
	<b>Further trigonometry</b> Formula for area of a triangle Sine rule in 2D and 3D Cosine rule in 2D and 3D Pythagoras Theorem in 3D	
14	<b>Collecting data</b> Types of data Bias and eliminating bias	
	<b>Cumulative frequency, box plots and histograms</b> Construct & interpret cumulative frequency tables/graphs Median, quartiles & interquartile range from cumulative diagrams Construct & interpret box plots Median, quartiles & interquartile range from box plots Construct & histograms Estimate the mean and median from a histogram	
15	<b>Quadratics, expanding more than two brackets, sketching graphs, graphs of circles, cubes and quadratics</b> Sketch quadratics Identify roots, turning points and intercepts of quadratic graphs Completing the square Expand the product of more than two linear expressions Sketch cubics Solve simultaneous equations graphically Solve and represent quadratic inequalities	
16	<b>Circle theorems</b> Parts of a circle Prove, recall and apply circle theorems	
	<b>Circle geometry</b> Recognise and construct the graph of a circle Find the equation of a tangent to a circle	
17	<b>Changing the subject of formulae (more complex), algebraic fractions, solving equations arising from algebraic fractions, rationalising surds, proof</b> Rationalise the denominator involving surds Simplify, multiply and divide algebraic fractions Change the subject of a complex formula Algebraic Proof Functions & function notation Inverse functions Composite functions	
18	<b>Vectors and geometric proof</b> Understand represent and use vector notation, including column notation Find the length of a vector Calculate the resultant of a vector Geometric problems in 2D where vectors are divided in a given ratio. Geometrical proofs to prove points are collinear & vectors/lines are parallel	
19	<b>Reciprocal and exponential graphs; Gradient and area under graphs</b> Recognise, sketch and interpret reciprocal graphs Calculate and interpret the area under a curve Calculate and interpret gradient of a tangent to a curve	
	<b>Direct and inverse proportion</b> Recognise and interpret graphs of direct & inverse proportion Set up and use formulae for direct & inverse proportion	

