

Subject: Mathematics – Higher Paper

Exam Board: AQA 8300

<https://www.aqa.org.uk/subjects/mathematics/gcse/mathematics-8300/specification-at-a-glance>

Overview

- Three Papers – Paper 1 is Non-Calculator and Paper 2 and 3 are Calculator
- All the specification will be assessed – **anything could come up on any paper** – the list of topics is attached
- All papers are 1 hour 30 minutes in length
- Revision Guides, Revision Cards, Equipment and Calculators are available to purchase via WisePay
(Please note that the turnaround from purchasing on WisePay to getting the product is not immediate)

Revision Sites

Sparx Maths – <https://www.sparxmaths.uk/>

This has extensive revision opportunities via the Independent Study section. In addition, the weekly homeworks are set up to provide additional support for students in preparation

Students have set up their own login details for this.

Corbett Maths – www.corbettmaths.com

This provides excellent support for students with practice questions and videos. No login details are required for this

Kerboodle - www.kerboodle.com

Our textbook that we use as our base for our courses is available here. Students have logins for Kerboodle and password resets can be done by speaking with individual teachers

Seneca Learning - <https://senecalearning.com/en-GB/>

Seneca is a great way to learn, with quick clips and quizzes to help

Third Space Learning - <https://thirdspacelearning.com/secondary-resources/>

An excellent site which breaks down topics into step-by-step guides and cards

Mathswatch – <https://vle.mathswatch.co.uk/vle/>

This is currently being phased out but login details still work. They have an excellent six week preparation plan via the extras page

Other Useful revision resources

- GCSEPod - <https://www.gcsepod.com/>
- BBC Bitesize Learning - <https://www.bbc.co.uk/bitesize/examspecs/z8sg6fr>
- Oak National Academy - <https://classroom.thenational.academy/subjects-by-key-stage/key-stage-4/subjects/maths>

Revision Tips

Revision for Mathematics is based upon practice (and more practice). You need to be confident at the skills and concepts that make up the course in order to be able to work through the more challenging problems. Revision should be interactive, not just reading notes

- RAG the topics (**Red** = not confident, **Amber** = have a grasp but need more practice, **Green** = Confident) in the revision list
- Work on the Red and Amber material first – return to the green from time-to-time
- Use the Revision Sites to start to work through these areas
- Work through maths problems and past papers – highlight questions you cannot do and ask friends, parents, teachers for help
- Do not just read your notes/revision guides as you need to practice your Maths skills.

AQA Higher Mathematics Checklist

Higher: Number		R	A	G
N1	Comparing and ordering numbers			
N2	Calculating with integers			
	Calculating with decimals			
	Multiplying and dividing with fractions			
N3	Using the order of operations			
N4	Working with multiples, factors and prime numbers			
N5	Applying systematic methods for listing groups			
	Using the product rule for counting to enumerate the number of possible groups			
N6	Calculating with powers and roots			
	Estimating powers and roots of any given positive number			
N7	Using the laws of indices			
	Calculating with fractional indices			
N8	Manipulating fractions and mixed numbers			
	Adding and subtracting fractions and mixed numbers			
	Simplifying surdic expressions			
	Calculating with surds			
	Rationalising the denominator of surdic fractions			
N9	Working with numbers in standard form			
N10	Converting between fractions and decimals			
	Converting between recurring decimals and their corresponding fractions			
N11	Using ratio notation			
	Making links between fractions and ratios			

Higher: Number		R	A	G
N12	Calculating with percentages			
	Converting between fractions and percentages			
N13	Using common units of measurement			
N14	Using estimation, including to check the accuracy of calculations			
N15	Understanding the use of rounding			
N16	Using upper and lower bounds			
	Calculating minimum and maximum amounts, using upper and lower bounds			

Higher: Algebra		R	A	G
A1	Understanding algebraic notation			
A2	Substituting into expressions and formulae			
A3	Understanding and using algebraic language and symbols			
A4	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			
A5	Understanding and using formulae in words and algebraic formulae			
	Rearranging algebraic formulae to change the subject			
A6	Manipulating algebraic expressions to support statements			
	Using algebraic expressions to prove outcomes			

Higher: Algebra		R	A	G
A7	Understanding and using function machines			
	Interpreting the reverse of a function machine as the 'inverse function'			
	Interpreting and using composite functions			
A8	Working with coordinates in four quadrants			
A9	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			
A10	Working out the gradient of a straight line			
	Working out the y -intercept of a straight line			
A11	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			
A12	Making links between different types of graphs and their equations			
	Recognising, sketching and interpreting graphs of exponential functions			
	Recognising, sketching and interpreting graphs of trigonometric functions			
A13	Sketching translations and reflections of graphs of a given function			
A14	Plotting and interpreting real-life graphs, including exponential graphs			
	Solving problems involving speed, distance, time and acceleration using graphs			
A15	Calculating (or estimating) gradients of graphs, and interpreting results in context			
	Calculating (or estimating) areas under graphs, and interpreting results in context			

Higher: Algebra		R	A	G
A16	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			
A17	Solving linear equations with one unknown			
	Solving linear equations with one unknown on both sides			
	Solving linear equations using graphs			
A18	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			
A19	Solving pairs of simultaneous equations using algebraic methods, including quadratic equations			
	Solving pairs of simultaneous equations using graphs			
A20	Finding approximate solutions to equations using iterative processes			
A21	Forming and solving equations (including simultaneous equations) from contexts			
A22	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			
A23	Writing the terms of a sequence from a rule given in words			
	Writing the terms of a sequence from a given nth term			

Higher: Algebra		R	A	G
A24	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			
A25	Writing the nth term of a linear sequence			
	Writing the nth term of a quadratic sequence			

Higher: Ratio, proportion and rates of change		R	A	G
R1	Changing freely between standard units of:			
	length			
	mass			
	volume/capacity			
	area/volume			
	time			
	compound units (speed, density)			
R2	Using scale factors			
	Using scale diagrams and maps			
R3	Writing one amount as a fraction of another			
R4	Simplifying ratios to their lowest terms			
	Writing a ratio in the form 1 : n and n : 1			
R5	Sharing amounts in a given ratio			
	Sharing amounts in contextual problems			
R6	Comparing amounts using ratios and fractions			
R7	Using proportion as the equality of ratios			

Higher: Ratio, proportion and rates of change		R	A	G
R8	Relating ratios to fractions			
	Relating ratios to equations			
R9	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			
R10	Calculating using simple interest			
	Solving problems involving direct proportion			
R11	Solving problems involving inverse proportion			
	Working with speed, distance and time			
	Working with density, mass and volume			
	Working with pressure, force and area			
R12	Working with rates and the unitary method			
	Solving length, area and volume problems with similar shapes			
R13	Solve problems involving trigonometric ratios and similarity			
	Understanding and using direct proportion algebraically			
	Understanding and using inverse proportion algebraically			
R14	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			

Higher: Ratio, proportion and rates of change		R	A	G
R15	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			
R16	Working with repeated proportional changes using a multiplier and a power, including compound percentages			
	Working with general iterative processes			

Higher: Geometry and Measures		R	A	G
G1	Using mathematical names and conventions with geometric figures			
G2	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			
G3	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			
G4	Describing the properties of common quadrilaterals			
G5	Using the basic criteria for congruent triangles			
G6	Reasoning mathematically with geometric figures			

Higher: Geometry and Measures		R	A	G
G7	Applying and describing the transformation of geometric figures using:			
	reflection			
	translation			
	rotation			
	enlargement by positive and negative, integer scale factors			
	enlargement by positive and negative, fractional scale factors			
G8	Describing the effect of a combination of transformations			
	Describing invariance in transformations			
G9	Identifying and naming the parts of a circle			
G10	Applying and proving the standard circle theorems			
G11	Solving problems using coordinates			
G12	Identifying and naming common 3D solids			
	Identifying and naming the parts of a 3D solid			
G13	Constructing plans and elevations of 3D solids			
G14	Using standard units of measure (length, area, volume/capacity, mass, time, money, etc.)			
G15	Measuring and drawing lines angles			
	Interpreting maps and scale drawings			
	Using bearings to describe direction			
G16	Knowing and applying formulae to calculate using:			
	area of triangles, parallelograms, trapezia			
	volume of cuboids			
	volume of prisms			
	volume of cylinders			

G17	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			
G18	Calculating using the lengths of arcs and the area of sectors			
G19	Understanding the effect of transformations, applying this to congruence and similarity			
	Applying the concepts of similarity to calculate areas and volumes of similar figures			
G20	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			
G21	Knowing the exact values for specific trigonometric ratios			
G22	Applying the sine rule to find unknown lengths and angles			
	Applying the cosine rule to find unknown lengths and angles			
G23	Calculating the area, sides and angles in angle triangles using $\frac{1}{2} ab \sin C$			
G24	Describing translation in 2D using vectors			
G25	Calculating using 2D column vectors			
	Using vectors to construct geometric arguments and proofs			

Higher: Probability		R	A	G
P1	Constructing and interpreting two-way tables, frequency tables and freq trees			
	Comparing relative frequencies to theoretical probabilities			
P2	Finding probabilities from lists and tables			
	Understanding the idea of relative frequency as an estimate of theoretical probability			
	Understanding the concept of randomness			
P3	Understanding and using the 0 – 1 probability scale			
	Estimating probabilities using relative frequency			
P4	Understanding and using the sum of the probabilities of mutually exclusive events (= 1)			
P5	Understanding the benefit of conducting a greater number of trials in an experiment			
P6	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			
P7	Listing the outcomes to events in systematic ways			
	Using and interpreting two-way tables			
	Using and interpreting frequency trees			
	Calculating probabilities from tables			
P8	Calculating probabilities using the 'and' and 'or' rules			
	Understanding whether two events are 'independent' or 'dependent'			
	Using a tree diagram to calculate probabilities			
P9	Calculating conditional probabilities using two-way tables			
	Calculating conditional probabilities using tree diagrams			
	Calculating conditional probabilities using Venn diagrams			

Higher: Statistics		R	A	G
S1	Analysing sets of data for patterns and outliers			
	Understanding the benefits and limitations of sampling			
S2	Constructing and interpreting:			
	frequency tables			
	bar charts, vertical line charts and frequency diagrams			
	pictograms			
	pie charts			
	time series graphs			
	two-way tables			
S3	cumulative frequency diagrams			
	histograms with equal class intervals			
	histograms with unequal class intervals			
S4	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			
S5	Using the mean, median, mode and range, as well as diagrams to describe sets of data			
S6	Using and interpreting scatter diagrams			
	Recognising correlation and describing relationships from scatter diagrams			
	Drawing lines of best fit and estimating unknown values			