Mathematics Higher GCSE

Exam Board: Edexcel
Subject: Mathematics
Papers: 1 Non-calculator and 2 Calculator
Marks available: 80 per paper
Length of paper: 1 hour 30 mins
Topics: Algebra, Number, Statistics, Geometry and Ratio and proportion

Exam Information, guidance and hints

Command words: A range of command words are used within the GCSE paper. Here are a few to help you get your revision started.

Explain: Write a sentence or mathematical statement to show how you got to your answer or researched your conclusion	**Show:** All workings needed to get to a given answer **or** complete a diagram to show given information.	**Draw:** Produce an accurate drawing (unless a sketch is being drawn).	**Sketch:** Produce a drawing that does not have to be drawn to scale or a graph that is drawn without working out each coordinate.	**Find:** Some workings will be needed to get to the final answer.
Expand: Remove brackets.	**Expand and simplify:** Remove brackets and then collect like terms.	**Describe:** Write a sentence that gives the features of the situation.	**Complete:** Fill in missing values.	**Justify:** Show all workings and/or give a written explanation.
Solve: Find the solution of an equation or inequality.	**Solve algebraically:** Find the solution of an equation or inequality; algebraic manipulation must be shown.	**Simply:** Make something smaller/shorter.	**Simplify fully:** Make something smaller/shorter (the answer must be in simplest form).	**Factorise:** Insert brackets by taking out a common factor.
Factorise fully: Insert brackets by taking out the highest common factor.	**Express:** Re-write in another form, some workings may be needed.	**Work out:** Some workings will be needed to get to the answer.	**Change:** Convert from one unit to another; either using known metric unit	**Give a reason:** Must be clear and accurate. If the reasons are geometrical

			conversion or the use of a conversion graph.	make sure you a) provide a reason for each stage of your working and b) use correct geometric terminology.
Write down: No workings are needed.	**Write:** no working is needed for a 1 mark question (this may not be the case for questions worth more than one mark).	**Calculate:** A calculator and some workings will be needed.	**Prove:** More formal than 'show', all steps must be present. In the case of a geometrical proof, reasons must be given.	**Prove algebraically:** Use algebraic notation throughout the proof.

Videos and markschemes:

Hannah Kettle
A qualified Maths teacher who works closely with exam boards and schools around GCSE revision. Hannah can be found on TikTok, Instagram, Youtube and via her website. Hannah Kettle's specialism is revision material throughout the year, going live weekly in the lead up to mocks and exams to support your revision at home. Past students have enjoyed her revision videos.
TikTok/Instagram/Youtube/Twitter handle - @hannahkettlemaths
Website - https://www.hannahkettlemaths.co.uk/

Maths Genie
A website with a vast amount of resources. If you are looking for topics specific content, maths genie proves a detailed video, exam questions linked to the topic and solutions for your to mark your work (both as mark schemes but also in a more student friendly format of worked solutions). Not only do they offer topic specific resources, they also offer paper specific revision. A whole section of their website is dedicated to past papers with solutions in three different formats (video, worked solutions and mark schemes).
Website - https://www.mathsgenie.co.uk/

On Maths
Some students prefer to work on a platform that marks their exam paper for them as they go along. On Maths offers paper based revision content that is tailored to previous exam papers but offers infinite tries at papers. Students receive a running total at the end of each paper allowing them to see when they have met a certain grade and what the correct answer is. Students have access to a video solution which will support their

development and show the correct answer entailed in the markscheme.
Website - https://www.onmaths.com/

1st Class Maths
Another free website with past papers, worked solutions and video solutions. 1st Class Maths work closely with exam boards and Hannah Kettle in producing predicted papers tailored to exam series.
Website - https://www.1stclassmaths.com/

Hints/tips:

- Show your workings - Every method mark counts!
- The paper is 80 marks, not just 25 or more questions - so try every question.
- 80 marks in 90 minutes - Aim for a minute a mark and it will leave you with 10 minutes to check your work.
- CHECK IT! Make sure you have read the question and check your response multiple times before the end of the exam.
- Don't scribble out your workings - a neat line through will allow the answer to see your method regardless if it is right or wrong.
- Make sure you attempt each question, if you can't complete the question fully, can you try and start the question (this often gets you part marks!).
- Your exam is an excuse to show off your maths, so take the opportunity and show the examiner what we see in lessons every day.

Number	**Key information related to topic**	**How well do you understand this topic? RAG**		
		Red	Amber	Green
Calculating with roots and fractional indices	Square and cube numbers. Fractional indices = Denominator is the type of root and the numerator is the power afterwards.			
Best buys	Recipes, conversion rates, value for money, comparisons and work rate problems.			

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Surds	Simplifying surds. Multiplying surds. Rationalising the denominator. Expanding brackets with surds.			
Standard form	Conversion between ordinary numbers and standard form (and back the other way). 4 operations with standard form (add, subtract, multiply and divide). Adjusting into standard form.			
Upper and lower bounds and Error Intervals.	Finding the upper and lower bounds of a calculation and stating its error interval. Working with the upper and lower bounds within calculations.			
Fractions Operations	Add, subtract, multiply and divide (including mixed numbers).			
Percentage	Of an amount (calc and non calc). Increase and decrease (calc and non calc). Reverse percentages (calc and non calc). Percentage change (calc and non calc).			
Prime factorisation	Expressing a number as a product of prime factors.			
HCF and LCM	Finding the highest common factor by listing factors. Finding the lowest common multiple by listing multiples. Finding the HCF and LCM by using the product of prime factors and venn diagrams.			
Converting recurring decimals to fractions	Using algebra to represent recurring decimals as			

	fractions. Using this method to complete four operations (add, subtract, multiply and divide) with recurring decimals.			

Ratio and proportion	**Key information related to topic**	**How well do you understand this topic? RAG**		
		Red	Amber	Green
Ratio	Simplifying fully. Simplifying to 1:n or n:1. Simplifying with different units. Sharing/dividing/splitting an amount (with and without units) across a ratio of two or more parts. Sharing/dividing/splitting within a ratio when you know one part. Sharing/dividing/splitting within a ratio when you know the difference between two parts. Compound ratios.			
Direct/Inverse Proportion	Working with recipes. Conversion rates. Best buys. Non algebraic direct and inverse proportion. Work rate problems. Algebraic representation of direct and inverse proportion.			
Compound Measures	Constructing and interpreting distance time graphs. Using the formula for speed, distance and time.			

	Using the formula for density, mass and volume. Using the formula for pressure, force and area. Convert between compound measures.			
Speed Time Graphs	Drawing, completing, analysing and using speed time graphs.			

Algebra	**Key information related to topic**	**How well do you understand this topic? RAG**		
		Red	Amber	Green
Substitution	Replacing the letter with its numerical value.			
Expanding and factorising	Using the FOIL method remove the brackets. Placing expressions into brackets based on common features.			
Manipulating powers	Multiplication = Add powers Division = Subtract powers Power of a power = Multiply the powers Negative power = Creates the reciprocal Fractional power = Denominator is the type of root and numerator is the power after. Expressing terms as powers with the same base to simplify.			
Algebraic fractions	Fractions with algebraic numerators or denominations (or both) - all calculations			
Solving equations	Solve equations using inverse operations. Types to solve: ● One step equations			

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	• Two step equations • Equations with brackets • Equations with fractions • Unknowns on both sides • Unknowns on both sides with brackets/fractions Solving simultaneous equations via elimination, substitution and graphically.			
Rearranging the formula	Using inverse operations.			
Algebra and proof	Use algebra to represent odd, even and consecutive numbers. Use algebra to prove statements. Use algebra to find counter-examples.			
Completing the square	Complete the square. State turning points by completing the square.			
Quadratics	Factorise in the form $x^2 + bx + c$. Factorise in the form $ax^2 + bx + c$. Solve via factorising. Solve via the quadratic formula. Sketch by factorising and solving.			
Exponential, exponential growth and decay	Repeated percentage change. Growth and decay with and without a calculator. Find the rate of growth or decay. Exponential graphs.			
Trigonometric graphs	Plot and sketch sine, cosine and tangent graphs. Solve simple trig equations using the graph (to find multiple values within a range). Transform trig graphs.			

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Functions	Use the function notation including using substitution. Use the function notation within solving. Find the inverse function. Find a composite function.			
Sequences	**Linear sequences:** Continue on with a pattern. State the term to term rule. Find the nth term rule. Explaining why a term is or is not in a sequence. Representing sequences pictorially. **Quadratic sequences:** Continue on with a pattern. State the term to term rule. Find the nth term.			
Area under a curve	Find the area under a curve.			
Graph transformation	Understand the transformation of graphs by describing or drawing (translation and reflection only).			
Equations of Circles	Use the equation of a circle formula. Find the equation of a tangent to a circle.			
Inequalities	Solve inequalities. State integers in an inequality. Drawing inequalities on a number line. Drawing multiple inequalities on a graph to find a region.			

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Statistics	**Key information related to topic**	**How well do you understand this topic? RAG**		
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Conditional Probability	Representing and working with conditional probability.			
Probability from Venn Diagrams	Drawing venn diagrams. Completing venn diagrams. Analysing venn diagrams.			
Experimental vs theoretical Probability	Understanding and explaining the difference.			
Probability trees	Completing probability trees. Analysing probability trees.			
Cumulative frequency	Completing/drawing cumulative frequency. Analysing cumulative frequency.			
Box Plots	Drawing box plots. Completing box plots. Finding median, range, lower quartile, upper quartile and the interquartile range. Comparing two or more sets of data using a box plot. Finding and drawing in outliers.			
Frequency polygons	Drawing a frequency polygon. Completing a frequency polygon. Analysing a frequency polygon.			
Histograms	Drawing histograms with equal and unequal class widths.			

	Completing histograms with equal and unequal class widths. Analysing histograms with equal and unequal class widths.			
Mode, Median, Mean and Range	Mode, Median, Mean and Range from a list. Mode, Median, Mean and Range from a table. Mode, Median, Mean and Range from a grouped table.			
Quartiles and interquartile range	Finding the lower quartile (LQ), Upper quartile (UQ) and interquartile range (IQR) from a list and from a graph (including a box plot).			
Sampling	Understanding the definition of sample. Knowing the different types of samples. Knowing the advantages and disadvantages of different types of samples. Knowing the steps to complete a random sample. Completing a stratified sample.			
Scatter Graphs	Plotting/Drawing scatter graphs. Correlation vs causation. Interpolation and extrapolation.			
Time Series	Construct time series graphs. Analyse time series graphs.			

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Geometry	**Key information related to topic**	**How well do you understand this topic? RAG**		
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Pythagoras' theorem	Use Pythagoras' theorem to find missing sides. Use Pythagoras' theorem in 3D problems.			
Angles	In a right angle, on a straight line and at a point. In parallel lines (co-interior, corresponding, alternate and vertically opposite). In polygons (different triangles, quadrilateral, irregular/regular polygons sum of angles, missing angles)			
Volume	Volume of cubes, cuboids, cones, spheres, cylinders, pyramids and frustums.			
Surface Area	Find and work with the surface area of cubes, cuboids, cylinders, prisms, cones, spheres, pyramids and frustums.			
Vectors	Work and use column vectors. Solve vector arithmetic problems. Solve geometric problems using vectors. Find midpoints and the value of k in scalar vectors. Recognise points that are on a straight line or parallel.			
Sine and Cosine rule	Use and understand the sine and cosine rule.			
Area of a triangle	Use and understand the area of a triangle rule.			
Circle Theorems	State, proof and use all circle theorems.			

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Similar Shapes	Find missing sides of 2D and 3D shapes. Find missing areas of 2D and 3D shapes. Find missing volumes of 3D shapes. Convert between metric units of area and volume. To be able to use ASA, SAS, SSS and RHS to prove congruence in triangles.			
Constructions and Loci	Perpendicular bisectors, bisecting an angle, a line perpendicular from/to a given point, construct an equilateral triangle, constructing triangles, constructing loci/locus of point(s), construct regions, bearings, scale drawings with bearings.			