SubjectHigher MathematicsExam BoardAQACourse Code8300

Overview

Mock Assessments	
One Non-Calculator Paper (Paper 1) 90 minutes.	Two Calculator Papers (Papers 2 and 3) 90 minutes for each paper.
Full mathematics equipment required.	

find approximate solutions to problems such as simple kinematic perobers in moving distance. Speed and acceleration, including reprotocal and exponential graphs and graphs in financial contexts. Eacles such as distance-time graphs, velocity-time graphs and graphs in financial contexts. Eacogonise and use the equation of a circle with centre at the origin time graphs and graphs in financial contexts. Ecogonise and use the equation of a circle with centre at the origin fine graphs and graphs in financial contexts. Ecogonise and use the equation of a circle with centre at the origin fine graphs and graphs in financial contexts. Ecogonise and use the equation of a circle with cases solutions to a nequation and those with the mean early with the unknown on both sides of the equation and those with the mean early with the unknown on both sides of the equation and those with the mean early with the unknown on both sides of the equation and those with the mean early indicated equations to an equation to an equation side of the equation side of the equation including those which here are and by using the quadratic tormula including those which mean early or the approximate solutions to an equation of and interpret the solution solve linear inequalities in one variable. The equation is and on a graph be able to form an equation of and on a graph or two variable(s) and duratic including and on a graph or the equation of and on a graph or the equation of the financial context and on a graph. The equation is and on a graph or the equation of the text including and on a graph or the equation of the equation or the equation of the eq
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understand and use proportion as equality of ratios relate ratios to fractions and to linear functions
relate ratios to fractions and to linear functions
define percentage as 'number of parts per hundred'

AQA Higher Mathematics – Bevision List	Algebra
	use and interpret algebraic notation, including:
Number	
order positive and negative integers, decimals and fractions	 3y in place of y + y + y and 3 × y a² in place of a x a, a³ in place of a x a x a, a²b in place of a x a x
use the symbols =, \neq , <, >, ≤, ≥	a
apply +, - , \times and \div to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative	 b In place of a ÷ b coefficients written as fractions rather than as decimals
understand and use place value	brackets
recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)	substitute numerical values into formulae and expressions understand and use the concepts and vocabulary of expressions, equations, formulae, inequalities, terms and factors
be able to use order of operations, including brackets, powers, roots and reciprocals (BIDMAS)	simplify and manipulate algebraic expressions (including those involving surds) by:
use the concepts and vocabulary of prime numbers, factors (divisors), multiples, HCF, LCM, prime factorisation, including using product notation and the unique factorisation theorem	 collecting like terms multiplying a single term over a bracket
apply systematic listing strategies, including the product rule	
use positive integer powers and associated real roots (squares up to 15 \times 15, cube and higher), recognise powers of 2, 3, 4, 5	
estimate powers and roots of any given positive number	 expansion group or more prackets factorising all guadratic expressions, including the difference of
Know that 1000 = 10^3 and 1 million = 10^6	
Calculate with roots and with integer and fractional powers	understand and use standard mathematical formulae e.g A = πr^2
Give exact answers as fractions and/or multiples of π	be able to change the subject of a formulae
calculate exactly with surds, simplify surd expressions involving	know the difference between an equation and an identity
squares and rationalise denominators	argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments, including
Understand and perform calculations involving numbers in standard form	where annronriate internret simple expressions as functions with
work interchangeably with terminating decimals and their	inputs and outputs
corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$)	understand functions, including inverse and composite functions i.e. $f(x) fg(x), gf(x) and f^{-1}(x)$
change recurring decimals into their corresponding fractions and vice versa	work with coordinates in all four quadrants
identify and work with fractions in ratio problems	plot graphs of equations that correspond to straight-line graphs in the coordinate plane
interpret fractions and percentages as operators	use the form y = mx + c to identify parallel and perpendicular lines
use standard units of mass, length, time, money and other measures (including standard compound measures)	find the equation of the line through two given points, or through one point with a civen creatient
know and use metric conversion factors for length, area, volume and capacity.	identify and interpret gradients and intercepts of linear functions pranhically and aloebraically
estimate answers	identify and interpret roots intercepts and turning points of guadratic
check calculations using approximation and estimation, including answers obtained using technology (mainly calculators)	functions graphically - find roots algebraically
round numbers and measures to an appropriate degree of accuracy (e.g., to a specified number of decimal places or significant figures)	deduce turning punts or a graph by compreming the square, identify the symmetry property of a quadratic
specify error intervals using inequalities e.g. $4.5 \le x \le 5.5$	recognise, sketch and interpret graphs of linear functions and quadratic functions, including simple cubic functions, the reciprocal
understand not to round values unless it is the final answer	function y = $\frac{1}{x}$ with x ≠ 0, exponential functions, y = k ^x and the
apply and interpret limits of accuracy e.g. to the nearest cm, including using upper and lower bounds	Ingeneric functions understand what happens when vou transform a graph

Probability	be able to use tables and frequency trees to display the outcomes of	probability experiments	calculate the expected outcome of future (or given) probability events	using appropriate language and the 0 to 1 probability scale to describe a theoretical probability	apply the property that the probabilities of all outcomes in an event	apply the property that the probabilities of mutually exclusive events	sum to 1 understand that an increase in the complexity (the number of trials)	will result in a more reliable result.	understand sets and combinations of sets systematically, using	tables, grids, venn diagrams, including using tree diagrams	understand and construct probability sample spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical prohabilities		calculate the probability of two or more events, whether independent or dependent	calculate and interpret conditional probabilities through	diagrams and Venn diagrams		Statistics	infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling	interpret and construct tables, charts and diagrams, including	Itequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their	appropriate use	construct and interpret diagrams for grouped discrete data and	continuous data, i.e. misrograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use	interpret, analyse and compare the distributions of data sets using either.	appropriate graphical representation involving discrete,	 continuous and grouped data, including box piots appropriate measures of central tendency (median, mean, mode and modal class) and somead (rance including consideration of 	outlet induction of the above and inter-quarter and an above and the terms of terms o	know and understand the terms, primary data, secondary data, discrete data and continuous data.	apply statistics to describe a set of data	use and interpret scatter graphs for bivariate data; know and	understand the terms for correlation: positive, negative, no, weak and strong.	draw estimated lines of best fit and make predictions	use a line of best fit to predict a value from the trend line (extrapolation and interpolation) whilst knowing the limitation of using a line of hest fit		
derive and apply the properties and definitions of: special types of	quadminater as, including square, rectangle, parameter and in apecium, kite and rhombus and triangles and other plane figures using	appropriate language lise the hasic contrinence criteria for triancles (SSS_SAS_ASA_BHS)	apply andle facts. triangle congruence, similarity and properties of	quadrilaterals to conjecture and derive results about angles and stides, including Pythagoras' theorem and the fact that the base	angres or an isosceles mangre are equar, and use mowin results to obtain simple proofs	identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection,	translation and enlargement, including fractional and negative scale factors	describe the changes and invariance achieved by combinations of	rotations, reflections and translations	Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and	segment		know and be able to apply circle theorems identify incrnation of the faces surfaces advas and varifaces of	cubes, cuboids, prisms, cylinders, pyramids, cones and spheres	interpret plans and elevations of 3D shapes	construct and interpret plans and elevations of 3D shapes	use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money etc.)	measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings including	the eight compass point bearings and three-tigure bearings.	know and apply formulae to calculate: area of triangles, parallelograms, trapezia;	volume of cuboids and other right prisms (including cylinders)	know the formulae for circumference and area of a circle,	calculate perimeters of 2D shapes, including circles, areas of circles and composite shapes	surface area and volume of spheres, pyramids, cones and composite solids including frustums.	calculate arc lengths, angles and areas of sectors of circles	apply the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures	know the formulae used for Pythagoras' theorem and trigonometric ratios and apply them to find angles and lengths in right-angled	triangles in 2D and 3D	know and be able to use the sine and cosine rules	know and use the area of a triangle using the sine area rule	know the exact values of sin $\theta,$ cos θ and tan θ for θ = 0°, 30°, 45°, 60°, 90°	60°, 90° describe translations as 2D vectors apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors		use vectors to construct geometric arguments and proofs	
interpret percentages and percentage changes as a fraction or a	ucclinial, and interpret triese multiplicatively express one quantity as a percentage of another	compare two quantities using percentages	work with percentages greater than 100%	solve problems involving percentage change, including percentage increase/decrease and original value problems. and simple interest	including in financial mathematics	solve problems involving direct and inverse proportion, including graphical and algebraic representations	use compound units such as speed, rates of pay, unit pricing,	compare lengths, areas and volumes using ratio notation	understand scale factors	make links to similarity (including trigonometric ratios)	understand that X is inversely proportional to Y is equivalent to X is proportional to -	X	construct and interpret equations that describe direct and inverse proportion	interpret the gradient of a straight-line graph as a rate of change	recognise and interpret graphs that illustrate direct and inverse	proportion	set up, solve and interpret the answers in growth and decay problems, including compound interest and work with general iterative processes	interpret the gradient at a point on a curve as the instantaneous rate of change	anning the concents of average and instantaneous rate of change	appy rite concepts of average and instantaneous rate of change dradients of chords and tangents) in numerical, algebraic and graphical contexts		Geometry and Measures	use conventional terms, vocabulary and notations	use the standard conventions for labelling and referring to the sides and angles of triangles e.g. labelling angle ABC	draw diagrams from written description	use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given	line from/at a given point, bisecting a given angle); use these to construct given figures and solve loci problems, including constructing an angle of 60°.	know that the perpendicular distance from a point to a line is the	shortest distance to the line	apply the properties of angles at a point (the angles total 180°),	angles at a point on a straight line (the angles total 300°) and vertically opposite angles	understand and use alternate and corresponding angles on parallel lines	derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular	bolygons)	

Useful revision resources
Websites
Mathswatch - <u>https://vle.mathswatch.co.uk/vle/</u>
Corbett Maths – <u>https://corbettmaths.com/</u>
GCSEPod - <u>https://www.gcsepod.com/</u>
Seneca Learning - https://senecalearning.com/en-GB/
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
Recommended Revision Guides
Collins GCSE AQA revision guides - £4.50 from your mathematics teacher
Corbett Maths revision cards - £6.50 from your mathematics teacher
Recommended Calculators
Casio fx-83 GTX, fx-85 GTX, Casio Classwiz EX-991 (recommended if continuing onto A-Level Mathematics)

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

Students can work through the Mathswatch 6 week plan (available from the Mathswatch Website under Extras > GCSE) or identify key topic areas via the Mathswatch list below. On the 6 week plan, students can split it up according to the two assessment periods)

A potential plan of action would be

- Work through the plans below watching the relevant videos (try the one minute videos first and if you do not understand then watch the longer videos)
- Attempting the interactive questions if needed
- Work through maths problems and past papers.
- Do not just read your notes/revision guides as you need to practice your Maths skills.

Any additional information will be placed into the GSHS Maths Revision Area http://bit.ly/GSHSMathsRevision

Perimeter, area and volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

Area of a trapezium = $\frac{1}{2}(a+b)h$

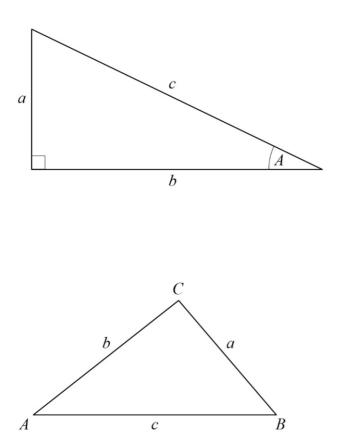
Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle = $2\pi r = \pi d$

Area of a circle = πr^2

Pythagoras' Theorem and Trigonometry



Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is number of times that the interest is compounded:

Total accrued = $P\left(1 + \frac{r}{100}\right)^n$

Quadratic formula

The solution of $ax^2 + bx + c = 0$ where $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

$$\sin A = \frac{a}{c}$$
 $\cos A = \frac{b}{c}$ $\tan A = \frac{a}{b}$

In any triangle ABC where a, b and c are the length of the sides:

sine rule:
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle $=\frac{1}{2}ab\sin C$

Probability

Where P(A) is the probability of outcome *A* and P(B) is the probability of outcome *B*:

P(A or B) = P(A) + P(B) - P(A and B)P(A and B) = P(A given B) P(B)