

What's New about GCSE for 2017

Parental Guide

The GCSE will be entirely assessed by written examination, which means no coursework will be required.

The content of our GCSE Mathematics specification has been grouped into topic areas: Number; Algebra, Ratio, proportion and rates of change; Geometry and measures, Probability; Statistics.

However, the main thing that's new about GCSE Mathematics is that it is going to change and be more demanding for everyone:

- The volume of subject content has increased for both Foundation tier and Higher tier
- The demand of that content is increasing too, with harder topics being introduced.
- The total time for the examinations is increasing, from 3 ½ hours to 4 ½ hours, which has meant three exam papers instead of two.
- There are fewer marks at the lower grades and more marks at the higher grades.
- A new grading structure is being introduced, from grade 9 to 1, to replace the familiar A* to G grading scale. 9 will be the highest grade, 1 the lowest.
- In the assessments there's a greater emphasis on problem solving and mathematical reasoning, with more marks now being allocated to these higher-order skills.
- Students will be required to memorise formulae – fewer formulae will be provided in examinations.

Together these changes are designed to help students emerge from GCSE Mathematics with a level of confidence and fluency that will provide a genuine foundation for the rest of their learning and working lives.

The Content

Would include both columns for foundation tier

Foundation Tier	New Foundation Tier
<p>Number</p> <ul style="list-style-type: none"> Integers and negative numbers Place value Four operations Fractions Decimals Fractions, decimals and percentages Reciprocal Primes, factors and multiples Approximations, estimations and rounding <ul style="list-style-type: none"> Roots and powers Index laws Standard form 	<p>Number</p> <ul style="list-style-type: none"> Rounding: use inequality notation to specify error intervals Index laws: zero and negative powers Standard form
<p>Algebra</p> <ul style="list-style-type: none"> Expressions, equations and formulae Algebraic manipulation <ul style="list-style-type: none"> Inputs and outputs Linear equations <ul style="list-style-type: none"> Quadratic equations Simultaneous equations Linear inequalities Sequences <ul style="list-style-type: none"> Coordinates in 2D Graphs: Linear, quadratic, cubic, reciprocal <ul style="list-style-type: none"> Real life graphs, e.g. distance-time, travel and conversation graphs Gradients of straight lines Roots, intercepts and turning points of quadratic functions 	<p>Algebra</p> <ul style="list-style-type: none"> Algebraic manipulation; expanding the product of two linear expressions Algebraic manipulation: factorise quadratic expressions in form $x^2 + bx + c$ Quadratic equations: solve by factorisation Simultaneous equations; linear/linear Sequences: Fibonacci, quadratic and geometric progressions Graphs: plot cubic and reciprocal graphs Graphs: gradient of a straight-line graph as a rate of change Roots, intercepts and turning points of quadratic functions
<p>Ratio, proportion and rates of change</p> <ul style="list-style-type: none"> Ratio and ratio notation Converting between units Scale factors, maps and scale drawings Percentages Direct and inverse proportion Compound measures Compound interest and multipliers 	<p>Ratio, proportion and rates of change</p> <ul style="list-style-type: none"> Ratio: relating to linear functions Direct and inverse proportion Compound measures: density and pressures

Foundation Tier	New Foundation Tier
<p>Geometry and measures</p> <ul style="list-style-type: none"> • Geometric reasoning • Angle properties • Properties of 2D shapes • Properties of 3D shapes • Plans and elevations • Area • Perimeter • Volume • Circles • Measures • Time calculations • Bearings, maps and scale drawings • Construction and loci • Transformations • Congruence and similarity • Pythagoras' Theorem • Trigonometry • Vectors 	<p>Geometry and measures</p> <ul style="list-style-type: none"> • Area and perimeter: compound shapes • Area and volume: more complex shapes and solids • Circles: lengths of arcs and areas of sectors of circles • Transformations: fractional enlargements • Trigonometry: ratios in 2D right-angled triangles Trigonometry: know the exact values of certain trigonometric ratios • Vectors
<p>Probability</p> <ul style="list-style-type: none"> • Probability scales • Frequency Tree • Theoretical probability • Relative frequency • Sample space diagrams • Adding probabilities • Venn diagram • Probability tree diagrams 	<p>Probability</p> <ul style="list-style-type: none"> • Venn diagrams • Tree diagrams
<p>Statistics</p> <ul style="list-style-type: none"> • Primary and secondary data • Sampling and bias • Tables and charts: pictograms, line, pie, bar, time-series, frequency polygons • Stem and leaf diagram • Scatter graphs and lines of best fit • Averages and range • Grouped data 	<p>Statistics</p> <ul style="list-style-type: none"> • Sources of bias and sampling







HIGHER TIER

Higher tier would include both columns for higher tier.

Higher Tier	New HigherTier
<p>Number</p> <ul style="list-style-type: none"> Integers and negative numbers Place value Four operations Product rule for counting Decimals Fractions, decimals and percentages Reciprocals Prime, factors, multiples, highest common factor, lowest common multiple Approximation, estimation and rounding 	<p>Number</p> <ul style="list-style-type: none"> Product rule for counting Rounding: use inequality notation to specify simple error intervals Roots and powers: estimate powers and roots of any given positive number
<p>Algebra</p> <ul style="list-style-type: none"> Expressions, equations and formulae Algebraic manipulation Algebraic fractions Algebraic proof Functions and functions notation Linear equations Quadratic equations Simultaneous equations Linear and quadratic inequalities, including set notation Iteration Sequences Coordinates in 2D Graphs: linear, quadratic, cubic, reciprocal, exponential, trigonometric, of circles Real-life graphs, e.g. distance-time, travel and conversion graphs Gradients of straight lines Transformation of functions Roots, intercepts and turning points of quadratic functions Area under graphs 	<p>Algebra</p> <ul style="list-style-type: none"> Algebraic manipulation: expand the product of more than two binomials Functions and function notation Iteration Sequences: Fibonacci, quadratic and geometric progressions Sequences: simple geometric progressions including surds Sequences: finding the nth term of quadratic sequences Graphs: gradient of a straight-line graph as a rate of change Roots, intercepts and turning points of quadratic functions; deduce turning points by completing the square
<p>Ratio, proportion and rates of change</p> <ul style="list-style-type: none"> Ratio and ratio notation Converting between units Scale factors, maps and scale drawings Percentages Direct and inverse proportion Compound measures Rates of change Compound interest and multipliers General iterative processes 	<p>Ratio, proportion and rates of change</p> <ul style="list-style-type: none"> Ratio: relating to linear functions <p>Rates of change</p>

Higher Tier	New Higher Tier
<p>Geometry and measures</p> <ul style="list-style-type: none"> • Geometric reasoning • Angle properties • Properties of 2D shapes • Properties of 3D shapes • Plans and elevations • Area • Perimeter • Volume • Circles • Measures • Bearings, maps and scale drawings • Constructions and loci • Transformations, including combinations • Congruence and similarity, including areas and volumes • Pythagoras' Theorem • Trigonometry, including sine and cosine rule, area of a triangle, and 3D shapes • Circle theorems • Vectors, including geometric proofs 	<p>Geometry and measures</p> <p>Trigonometry: know the exact values of certain trigonometry ratios</p>
<p>Probability</p> <ul style="list-style-type: none"> • Frequency trees • Theoretical probability • Relative frequency • Sample space diagrams • Adding probabilities • Venn diagrams • Probability tree diagrams • Conditional probabilities 	<p>Probability</p> <ul style="list-style-type: none"> • Venn diagrams • Tree diagrams • Conditional probabilities: Venn diagrams
<p>Statistics</p> <ul style="list-style-type: none"> • Primary and secondary data • Sampling and bias • Tables and charts: line, pie, bar, time-series frequency polygons • Stem and leaf diagrams • Histograms with unequal class intervals • Scatter graphs and lines of best fit • Averages, range and quartiles • Grouped data • Box plots • Cumulative frequency 	<p>Statistics</p>

How is it examined?

Foundation (Grades 1-5)	Paper 1 Non-calculator 33.3% weighting  1 Hour and 30 minutes 80 Marks	Paper 2 Calculator 33.3% weighting  1 Hour and 30 minutes 80 Marks	Paper 3 Calculator 33.3% weighting  1 Hour and 30 minutes 80 Marks
	Paper 1 Non-calculator 33.3% weighting  1 Hour and 30 minutes 80 Marks	Paper 2 Calculator 33.3% weighting  1 Hour and 30 minutes 80 Marks	Paper 3 Non-calculator 33.3% weighting  1 Hour and 30 minutes 80 Marks

Formulae

Below is a list of formula that students do not have to memorise and can be provided within the examination as part of the relevant question.

All other formula will need to be learnt.

Where r is the radius of the sphere or cone, ℓ is the slant height of a cone and h is the perpendicular height of a cone:

Curved surface area of a cone = $\pi r \ell$

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

The new foundation tier

Staff will be working with students in making decisions as to which tier of entry (Foundation or Higher) is most appropriate. Staff will look at previous assessments, milestones, mock papers and classwork/homework to make this decision. It is important to remember that the new foundation tier is more demanding than the previous foundation tier.

Here are some things to consider when deciding a tier of entry:

A grade 5 – the new good pass can be attained through foundation.

There is harder content that has been introduced to Foundation from Higher tier such as simultaneous equations.

The Foundation papers include questions targeted at the top of grade 5 which is broadly comparable to a low grade B

The papers will include more questions testing higher order skills such as problem solving and reasoning.

There are common questions between Foundation and Higher tier papers that appear towards the end of Foundation tier sample and from the first part of the Higher tier sample questions.