GCSE MATHEMATICS COURSE GUIDE

You are following a 2-year GCSE course at Foundation tier, with available grades 1-5.
A checklist of many of the GCSE topics is given below, to help guide your revision.

Skill	Approx. grade	
Understand and use powers and roots	2	
I can identify square numbers up to 15 x 15	1	
I can convert between ordinary numbers and standard form	4	
I can calculate using standard form, with and without a calculator	5	
I can apply the index laws for multiplying, dividing, power of 0 and brackets	4	
I can work out calculations involving square roots and cube roots	5	
I can put numbers in order: whole numbers, fractions, decimals, and combinations of these	3/4	
I know the value of all of the digits in a whole number	1	
I can estimate the answers to calculations	3/4	
I can round numbers to decimal places, or to significant figures	3/4	
Find the upper/lower bounds for a measurement, including writing these using an inequality	5	
Add, subtract, multiply & divide with fractions/mixed numbers, including to solve problems	4	
I can write one amount as a fraction of another amount	1	
I can increase or decrease a quantity using a fraction	3	
Convert between fractions, decimals and percentages, and use this to put numbers in order	3	
I know how to cross-cancel fractions before multiplying, where the numbers are large	5	
I can solve problems involving repeated increase or decrease by a fraction	5	
Where a quantity has been increased/decreased by a fraction, work out the original amount	5	
I know the difference between an expression, equation and formula	2	
I can simplify algebra expressions by collecting 'like terms' together	2	
I can multiply and divide expressions, including dealing with powers	3	
I know what an identity is and how this differs from an equation	5	
I can manipulate algebra to show that two different expressions are equivalent	5	
I can use algebra in various problems, such as area, perimeter and Pythagoras' theorem	5	

Skill	Approx. grade	
I can simplify algebraic expressions involving surds	5	
I can multiply out (expand) a bracket	3	
I can factorise an expression by putting it into a bracket	3	
I can expand a 'double bracket', and I know how to expand $(3x + 2)^2$	5	
I can expand a single or double bracket involving surds	5	
Factorise a simple quadratic expression, and use this to solve an equation	5	
I can factorise an expression involving surds into a single bracket	5	
I can work out probabilities for a given situation (e.g. when a dice is rolled)	1/2	
I can solve problems using a probability scale from 0 to 1	1/2	
I can use probabilities to work out how many times something is *expected* to happen	3	
I can estimate probabilities using results of an experiment, and use the term 'relative frequency'	4	
I can use the fact the probabilities or all the possible outcomes add up to 1	3	
I can list all the possible ways something could happen, and use the list to find probabilities	3	
I can complete a sample space diagram (e.g. for two dice), and use it to find probabilities	3	
I know that repeating an experiment more times gives a better estimate of a probability	4	
I can calculate probabilities in more complex situations, and I know when to add/multiply	5	
I can draw a probability tree diagram for a situation, and use it to calculate probabilities	5	
I can use Venn diagrams, frequency trees and two-way tables to identify probabilities	5	
I can solve equations, including with brackets	3/4	
I can estimate solutions to an equation using a graph	4	
I can solve equations with the letter on both sides of the equation, or with fractions	4	
I can use a curve graph to solve equations, and identify 'roots'	4/5	
I can solve two simultaneous equations by adding or subtracting	5	
I can estimate solutions to simultaneous equations using a graph	5	
I can add, subtract, multiply and divide with large whole numbers	1/2	
I understand financial terms such as profit, loss, cost price, selling price, debit, credit, balance, income tax, VAT, and interest rate	2/3	
I know the correct order to work out a calculation, including brackets	2	

Skill	Approx. grade	
I can substitute numbers into formulae, including negative numbers	2	
I can rearrange a formula to change the subject, including with powers or roots	3/4	
I can write a formula to represent a practical situation	3	
I can rearrange a formula where the subject appears twice	5	
I can calculate percentages with and without a calculator	2/3	
I can increase or decrease an amount by a percentage, including solving word problems	3	
I can find the new amount after a *repeated* percentage change, including compound interest	4	
I can write one amount as a percentage of another amount	3	
I can use percentages to compare two different amounts	3/4	
Where a quantity has been increased/decreased by a percentage, I can find the original amount	5	
I can work out how many increases/decreases by a percentage are needed to give a final amount	5	
I can read and plot positive and negative co-ordinates	1/2	
I can plot a line graph from its equation, by working out some co-ordinates that are on the line	3	
I can identify the gradient and y-axis intercept from a line equation such as $y = 5x + 2$	4	
I can plot a curve graph using a table of values	4	
I can plot a distance-time graph or speed-time graph, and use one to solve problems	3/4	
I know how to identify *parallel* lines from their equations	4	
I can find the equation of line using two points on the line, or using one point and the gradient	5	
I can identify the roots, vertex (turning point) or line of symmetry from a quadratic (x^2) graph	4/5	
I can find roots of a quadratic (x^2) graph by solving an equation	5	
I can recognise or sketch a graph of $y = 1/x$ and simple graphs involving x^3	5	
I understand that a gradient is a 'rate of change' and can use gradients to solve practical problems	5	
I can find the midpoint of a line segment, or the length of a line segment, using the two end points	5	
I can rotate, reflect or translate a shape on a co-ordinate grid	2/3	
I can enlarge a shape using a centre of enlargement and a scale factor (e.g. scale factor 3)	3	
I can fully describe a rotation, reflection or translation, using a vector to describe a translation	3	

Skill	Approx. grade	
I can identify two shapes that are congruent, or similar	1	
I can enlarge a shape using a fraction scale factor (and a centre of enlargement)	3/4	
I can add, subtract and multiply with column vectors	5	
I can solve vector problems on a grid	5	
I can prove triangles are congruent using SSS, SAS, AAS and RHS	5	
I can calculate missing lengths in similar shapes	4	
I understand the symbols =, ≠, <, >, ≥, ≤ and know when to use them	1	
I can solve an inequality (e.g. $5x - 8 < 12$) and show the solution on a number line	3/4	
I can construct and read tables and diagrams e.g. bar chart, vertical line chart, pictogram	1/2	
I understand scatter graphs and different types of correlation	3/4	
I can use graphs to compare two different sets of data	3/4	
I can construct and use a line graph for time series data	4	
I know that correlation does not imply causation	4	
I can draw a line of best fit on a scatter graph, and use it to make predictions I understand why a prediction is unreliable for a value outside the range of the original data	4	
I can find the upper quartile, lower quartile and interquartile range for a simple set of data	5	
I can construct a box plot to represent a list of for a simple set of data (e.g. a list of numbers)	5	
I can find the mean, median, mode or range for a simple list of numbers	1	
I can estimate the mean/range, and find the modal class, from a table of data (including grouped)	2/3	
I can use an average and the range to compare sets of data	3	
I can identify different types of data, such as primary, secondary, discrete, continuous	3	
I can find the median from a table of data I can find the class interval containing the median from a table of grouped data	4	
I can use data from a sample to draw a conclusion, and I understand the limitations of sampling	4	
I understand shape terms such as point, line, vertex, vertices, edge, plane, parallel, perpendicular, right angle, polygon, and regular	2	
I can identify lines of symmetry for a shape, and the order of rotation symmetry	1/2	
I can identify mathematical properties for shapes, including triangles and special quadrilaterals	2	

Skill	Approx. grade	
I understand how capital letters are used to identify shapes, sides, and angles	2	
I know the names for polygons (shapes) with 5, 6, 8 and 10 sides	1	
I can identify these parts of a circle: centre, radius, diameter, circumference and chord	2	
I can identify these parts of a circle: tangent, arc, sector, segment	4	
I know the formula for Pythagoras' theorem, and I can use it to solve problems	4	
I can construct a shape, such as a triangle, using a written description or from a diagram	3	
I can perform standard constructions such as an angle bisector, or perpendicular bisector	4	
Use standard constructions to solve practical problems, identifying a locus or shading a region	4	
I know that the perpendicular is the shortest distance from a point to a line	5	
I can construct an angle of 60° using compasses	4	
I understand and can identify factors, multiples, prime numbers, common multiples, common factors, the lowest common multiple (LCM) and the highest common factor (HCF)	1/2	
I can use a factor tree to write a number as a product of its prime factors, including using indices I can use this to find the highest common factor, or lowest common multiple for large numbers	2/3	
I can add, subtract, multiply and divide with decimals	2	
I can add, subtract, multiply and divide combinations of whole numbers, decimals and fractions	3/4	
I know the correct way to write recurring decimals	3	
I can calculate missing angles using the rules for angles at a point, and on a straight line	2	
I can identify situations where 'opposite angles are equal'	2	
I can identify alternate angles and corresponding angles near parallel lines	3	
I can calculate missing angles in a triangle	2	
I can work out the total of the angles in any polygon by dividing it into triangles	3	
I can measure and plot 3-figure bearings, and I understand the bearing of "A from B"	4	
I can calculate missing angles in isosceles triangles	4	
I can use sin, cos & tan to calculate sides and angles in right-angled triangles	5	
I know the exact values of sin & cos for 0°, 30°, 45°, 60° and 90° I know the exact values of tan for 0°, 30°, 45° and 60°	5	

Skill	Approx. grade	
I can use standard units of mass, length, area, volume/capacity, time and money	1	
I can convert between metric units of length, area, volume and capacity	2	
I can calculate with speed, distance and time	3/4	
I can calculate with density, pressure, rates of change, and population density	5	
I can change between units of density and pressure	5	
I can use ratio notation and simplify a ratio	1/2	
I understand how ratios are linked to fractions	1/2	
I can divide a quantity into two parts using a ratio, or use one part to find the other (or the whole)	3/4	
I can write a ratio in the form 1 : n, and use this to compare ratios	4	
I can use algebra to solve a problem involving direct or inverse proportion	4	
I know how direct or inverse proportion appears on a graph	4	
I can use the terms: face, surface, edge, and vertex (vertices) for 3D solids	1/2	
I can identify a 3D solid using its plan, front elevation and side elevation	3	
I can construct a plan, front elevation and side elevation from a 3D drawing of a solid	4	
I can remember and use the formulae for the area of a rectangle, triangle, parallelogram, trapezium and composite shapes	1/2	
I can calculate the volume of a cuboid, prism or cylinder	2/3	
I can remember and use the formulae for the area and circumference of a circle	3	
I can calculate the perimeter of a shape, including a shape made from rectangles	1/2	
I can calculate answers in terms of π	4	
I can calculate the surface area and volume of spheres, pyramids and cones	4	
I can calculate the length of an arc and the area of a sector of a circle	5	
I can calculate the surface area of cubes, cuboids, prisms and cylinders	4	
I can use function machines, and complete input-output tables	1	
I can find the next term in a sequence, and explain how I worked it out	1	
I can use an expression for the nth term to work out any term in a sequence	2	
I can recognise a sequence of square, triangle or cube numbers	2	
I can work out an expression for the nth term of a (linear) sequence	3	
I can find an expression for the nth term of a simple quadratic sequence, by comparing with n^2	4	
I can work with sequences that are more complex than simple adding & subtracting	4/5	