Maths Assessment Map

	Number			Algebra				Geometry and Measures			Probability and Statistics	
	Structure and Calculation	Fractions, Decimals and Percentages	Ratio and Proportion	Notation and Manipulation	Graphs	Equations and Inequalities	Sequences	Properties and Construction	Mensuration and Calculation	Vectors	Probability	Statistics
Band 1	read, write, order and compare numbers and determine the value of each digit use negative numbers in context round any whole number to a required degree of accuracy perform mental calculations add and subtract whole numbers with more than 4 digits solve problems involving addition, subtraction, multiplication and division use estimation to check answers to calculations multiply multi-digit numbers up to 4 digits by a two-digit whole number divide numbers up to 4 digits by a two-digit whole number identify common factors, common multiples and prime numbers	compare and order fractions use common factors to simplify fractions; use common multiples to express equivalent fractions add and subtract fractions with different denominators and mixed numbers multiply simple pairs of proper fractions divide proper fractions by whole numbers multiply one-digit numbers with up to two decimal places by whole numbers associate a fraction with division and calculate decimal fraction equivalents recall and use equivalences between simple fractions, decimals and percentages	solve problems involving unequal sharing using knowledge of fractions and multiples solve problems involving the calculation of percentages	use simple formulae		express missing number problems algebraically	generate and describe linear number sequences	draw 2-D shapes using given dimensions and angles find unknown angles in any triangles, quadrilaterals, and regular polygons compare and classify geometric shapes based on their properties and sizes solve problems involving similar shapes where the scale factor is known or can be found illustrate and name parts of circles recognise, describe and build simple 3-D shapes, including making nets	convert between miles and kilometres recognise that shapes with the same areas can have different perimeters and vice versa calculate, estimate and compare volume of cubes and cuboids	draw and translate simple shapes on the coordinate plane, and reflect them in the axes		interpret and construct pie charts and line graphs and use these to solve problems calculate and interpret the mean as an average
Band 2	order positive and negative integers, decimals and fractions use the symbols =, ≠, <, >, ≤, ≥ apply the four operations, to integers, decimals and simple fractions (proper and improper), and mixed numbers understand and use place value to include decimals recognise and use relationships between operations, including inverse operations priority of operations, including brackets highest common factor and lowest common multiple recognise powers of 2, 3, 4, 5 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate		change freely between related standard units in numerical contexts express one quantity as a fraction of another use ratio notation, including reduction to simplest form divide a given quantity into define percentage as 'number of parts per hundred' interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively express one quantity as a percentage of another compare two quantities using percentages solve problems involving percentage change	use and interpret algebraic notation substitute numerical values into formulae and expressions understand and use the concepts and vocabulary of expressions, equations, formulae and terms manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket understand and use standard mathematical formulae interpret simple expressions as functions with inputs and outputs	work with coordinates in all four quadrants understand and use lines parallel to the axes, y=x and y=-x	solve linear equations in one unknown algebraically	generate terms of a sequence from a term-to-term rule recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions	use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries use the standard conventions for labelling and referring to the sides and angles of triangles draw diagrams from written description apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles derive and apply the properties and definitions of special types of quadrilaterals and triangles identify, describe and construct congruent shapes by considering rotation, reflection and translation identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres	use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.) measure line segments and angles in geometric figures know and apply formulae to calculate area of triangles, parallelograms, trapezia calculate perimeters of 2D shapes know and apply formulae to calculate volume of cuboids	describe translations as 2D vectors		interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data and know their appropriate use interpret, analyse and compare the distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range)
Band 3	round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures) apply the four operations to include negatives priority of operations, including brackets, powers, roots and reciprocals prime factorisation, including using product notation and the unique factorisation theorem calculate exactly with fractions interpret standard form round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)	work with terminating decimals and their corresponding fractions identify and work with fractions in ratio problems interpret fractions and percentages as operators	change freely between compound units in numerical contexts express the division of a quantity into two parts as a ratio; apply ratio to real contexts express a multiplicative relationship between two quantities as a ratio or a fraction relate ratios to fractions and to linear functions use scale factors, scale diagrams and maps compare lengths, areas and volumes using ratio notation work with percentages greater than 100% percentage change, including original value problems, and simple interest including in financial mathematics	use and interpret algebraic notation, including: a^2b in place of a × a × b, coefficients written as fractions rather than as decimals substitute numerical values into scientific formulae understand and use the concepts and vocabulary of factors manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums, products and powers, including the laws of indices rearrange formulae to change the subject	plot graphs of equations that correspond to straight-line graphs in the coordinate plane identify and interpret gradients and intercepts of linear functions graphically recognise, sketch and interpret graphs of linear functions and simple quadratic functions plot linear graphs that may include speed etc	solve linear equations with the unknown on both sides of the equation find approximate solutions to linear equations using a graph	generate terms of a sequence from either a term-to-term or a position-to-term rule deduce expressions to calculate the nth term of linear sequences	understand and use alternate and corresponding angles on parallel lines identify, describe and construct similar shapes by considering enlargement identify and apply circle definitions and properties interpret plans and elevations of 3D shapes	interpreting maps and scale drawings and use of bearings know and use the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2 calculate surface area of cuboids know and apply formulae to calculate volume of right prisms (including cylinders)		record describe and analyse the frequency of outcomes of probability experiments apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale construct theoretical possibility spaces for single experiments apply the probabilities of an exhaustive set of outcomes sum to one enumerate sets and combinations of sets systematically, using tables, grids and Venn diagrams construct theoretical possibility spaces for combined experiments	apply statistics to describe a population interpret, analyse and compare the distributions through appropriate graphical representation involving discrete, continuous and grouped data use and interpret scatter graphs recognise correlation

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Band 4	calculate with standard form		solve problems involving direct and inverse proportion, including graphical and algebraic representations	understand and use the concepts and vocabulary of inequalities and identities	identify and interpret gradients and intercepts of linear functions algebraically recognise, sketch and interpret graphs of quadratic functions				calculate surface area of right prisms (including cylinders)			
Band 5	calculate with roots, and with integer indices calculate exactly with multiples of π use inequality notation to specify simple error intervals due to truncation or rounding		make links to similarity and scale factors interpret the gradient of a straight line graph as a rate of change	manipulate algebraic expressions (including those involving surds) by expanding products of two binomials and factorising quadratic expressions of the form $x^2 + bx + c$ know the difference between an equation and an identity argue mathematically to show algebraic expressions are equivalent	use the form y = mx + c to identify parallel lines find the equation of the line through two given points, or through one point with a given gradient recognise, sketch and interpret graphs of simple cubic functions and the reciprocal function	solve two linear simultaneous equations algebraically find approximate solutions to simultaneous equations using a graph solve quadratic equations algebraically by factorising find approximate solutions to quadratic equations using a graph translate simple situations or procedures into algebraic expressions or formulae solve linear inequalities in one variable represent the solution set to an inequality on a number line	recognise and use Fibonacci type sequences, quadratic sequences	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; know that the perpendicular distance from a point to a line is the shortest distance to the line apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' Theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS) identify and apply more complex circle definitions and properties including: tangent, arc, sector and segment construct plans and elevations of 3D shapes	calculate arc lengths, angles and areas of sectors of circles congruence and similarity know and use the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$ in two dimensional figures		using tree diagrams understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size calculate the probability of independent and dependent combined events, including using tree diagrams	use tables and line graphs for time series data draw estimated lines of best fit; make predictions know correlation does not indicate causation
Band 6			make links to similarity (including trigonometric ratios) understand that X is inversely proportional to Y is equivalent to X is proportional to 1/Y interpret equations that describe direct and inverse proportion 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	simplify algebraic expressions including the difference of two squares	identify and interpret roots, intercepts, turning points of quadratic functions graphically deduce roots of quadratic functions algebraically plot reciprocal or exponential graphs that may include speed etc	solve two linear simultaneous equations algebraically solve quadratic equations (including those that require rearrangement) algebraically by factorising	recognise and use simple geometric progressions (r^n where n is an integer, and r is a rational number > 0)	identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement with whole number scale factors	calculate surface area and volume of spheres, pyramids, cones congruence and similarity, including the relationships between length know the trigonometric ratios and use in 2-d figures know the exact values of sinθ and cosθ for θ = 0°, 30°, 45°, 60° and 90°; know the exact value of tanθ for θ = 0°, 30°, 45° and 60°			infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling interpret, analyse and compare the distributions using box plots
Band 7	estimate powers and roots of any given positive number calculate with fractional indices calculate exactly with surds apply upper and lower bounds	change recurring decimals into their corresponding fractions and vice versa	interpret the gradient at a point on a curve as the instantaneous rate of change	simplify and manipulate algebraic fractions interpret the reverse process as the 'inverse function'	use the form y = mx + c to identify perpendicular lines calculate or estimate gradients of graphs and areas under graphs in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts recognise and use the equation of a circle with centre at the origin find the equation of a tangent to a circle at a given point	solve two simultaneous equations in two variables where one is quadratic algebraically find approximate solutions to equations numerically using iteration solve linear inequalities in two variables represent the solution set to an inequality using set notation and on a graph	deduce expressions to calculate the nth term of quadratic sequences	describe the changes achieved by combinations of rotations, reflections and translations apply and prove the standard circle theorems enlarge with fractional scale factors	congruence and similarity with areas and volumes in similar figures know and use the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$ in three dimensional figures	apply addition, subtraction and multiplication of vectors by a scalar, and diagrammatic and column representations of vectors	calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams	construct and interpret cumulative frequency graphs, and know their appropriate use compare using quartiles and inter-quartile range
Band 8									calculate surface area and volume composite solids			
Band 9	simplify surd expressions and rationalise denominators		construct equations that describe direct and inverse proportion apply the concepts of average and instantaneous rate of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts work with general iterative processes	manipulate algebraic expressions by factorising quadratic expressions of the form $ax^2 + bx + c$ interpret the succession of two functions as a 'composite function'	deduce turning points of quadratic functions by completing the square recognise, sketch and interpret graphs of exponential functions and the trigonometric functions y = sin x, y = cos x and y = tan x sketch translations and reflections of a given function	solve quadratic equations by completing the square and by using the quadratic formula solve quadratic inequalities in one variable	recognise and use simple geometric progressions (r^n where n is an integer, and r is a rational number > 0 or a surd) and other sequences	enlargement (including negative scale factors)	know the trigonometric ratios and use in 3-d figures know and apply the sine rule, and the cosine rule know and apply Area = ½ab sinC	use vectors to construct geometric arguments and proofs		construct and interpret histograms with equal and unequal class intervals and know their appropriate use