

YEAR 8 - KEY SKILLS IN MATHS



Key Objective		Developing	Secure	Greater Depth
1	To round numbers to an appropriate degree of accuracy.	I can identify the place value of any digit in an integer up to one billion.	I can round numbers to any given degree of accuracy including decimals.	I can solve problems involving rounding and check calculations using approximation, estimation or inverse operations.
2	To calculate with roots and integer indices.	I can calculate with positive indices (roots) using written methods.	I can calculate with positive and negative indices in the context of standard form. I can enter a calculation written in standard in into a scientific calculator.	I can calculate using the four operations and numbers written in standard form.
3	To apply the multiplication, division and power laws of indices.	I know the multiplication and division laws of indices. I know the power law of indices.	I can use the multiplication and division laws of indices. I can use the power law of indices.	I apply the multiplication, division and power laws of indices.
4	To convert numbers into standard form and vice versa.	I can write a large number in standard form. I can write a small number in standard form.	I can convert numbers from standard form to ordinary numbers. I can use positive integer powers and associated real roots.	I can perform simple calculations with numbers in standard form. I can calculate with negative indices and interpret error interval notation.
5	To calculate theoretical probabilities for single events.	I know to write probabilities as fractions, decimals or percentages. I can use fractions, decimals and percentages when working with probabilities.	I understand, and can identify, equally likely outcomes of events. I can work out the probabilities of single events. I can use the fact that the sum of all probabilities for an event is one. I understand and use the term 'Mutually Exclusive'.	I can calculate the conditional probabilities associated with two simultaneous events. I can construct sample space diagrams and probability trees for two simultaneous events.
6	To use tree diagrams to list outcomes and calculate conditional probabilities (using appropriate language and the probability scale).	I understand the difference between discrete and conditional probability. I understand the difference between experimental and theoretical probability.	I can construct and label a tree diagram with probabilities when events are dependent. I know when to add two or more probabilities. I know when to multiply two or more probabilities.	I can use a tree diagram to calculate probabilities of independent combined events. I can use a tree diagram to calculate probabilities of dependent combined events.
7	To identify probabilities from a venn diagram.	I can use a venn diagram to sort integers appropriately.	I can interpret venn diagrams. I can explain probabilities from a venn diagram using appropriate language and the probability scale.	I can use product rule to find the total number of outcomes.
8	To find a relevant multiplier when solving problems involving proportion.	I can find a (whole number) multiplier to move from one number to another.	I can find a (fractional) multiplier to move from one number to another. I can use a multiplier to find missing values in a proportion problem.	I can identify when a set of numbers are in proportion. I can set up a proportional reasoning table when solving problems.
9	To use ratio notation.	I can explain simple ratios from a pictorial representation. I know that ratios are presented like this: 2:3	I can write a ratio to reflect a statement. I can divide into a given ratio. I can simplify ratios.	I can use pi as a ratio.
10	To use fractions fluently in situations involving ratio and proportion.	I understand the connection between fractions, ratio and proportion.	I can convert a given ratio into a fraction and vice versa. I can convert a given proportion into a fraction and vice versa.	I use fractions to solve ratio and proportion problems.
11	To solve problems involving percentage change, including original value problems.	I can identify and use a multiplier to increase or decrease an amount by a percentage.	I can find a percentage change for a given situation. I can identify a reverse percentage problem (finding the original value)	I can find the original value in a percentage problem.
12	To work with coordinates in all 4 quadrants.	I can identify points in the first quadrant. I can identify the X and Y axes.	I can draw axes and plot points in all four quadrants. I can identify and draw lines parallel to the axes.	I can find the midpoint of a line segment.
13	To recognise gradients of straight lines and to know that $y=mx+c$.	I can rearrange an equation in the form $y = mx + c$ where m and c are positive integers.	I can rearrange an equation with negative values in the form $y = mx + c$. I know that m signifies the gradient (steepness) of the line. I know that c shows where the line crosses the y axis.	I can rearrange formula into $y = mx + c$ including negative and fractional values and plot corresponding graphs to solve problems.
14	To solve linear equations with unknowns on both sides.	I know how to solve an equation by balancing both sides.	I can solve an equation with unknowns on both sides. I can solve an equation with unknowns on both sides when brackets are involved. I know how to deal with negative numbers as solutions.	I know how to deal with fractions as solutions. I can construct an equation from given information.
15	To change the subject of a formula when two steps are required.	I can identify inverse operations. I can identify the correct order of 'undoing' a formula.	I can change the subject of a formula involving one step. I can change the subject of a formula involving two steps. I can change the subject of a formula when the new subject is being subtracted.	I can express an equation in the form $y=mx+c$ as $m=$, $x=$ and $c=$
16	To simplify and manipulate expressions by multiplying a single term over a bracket.	I know that values outside brackets must be multiplied by values inside of brackets.	I can simplify expressions by collecting like terms. I can change the subject of a formula.	I can expand pairs of binomials.
17	To factorise an expression by taking out common factors.	I can factorise an expression by taking out a numerical factor.	I can factorise an expression by taking out an algebraic factor. I can factorise an expression by taking out a numerical and an algebraic factor.	I can recognise when an expression is fully factorised.
18	To use and understand the concepts and vocabulary of inequalities.	I understand the meaning of the four inequality symbols. I can choose the correct inequality symbol for a particular situation.	I can find a set of integers that are solutions to an inequality. I can use a formal method to solve an inequality. I know how to show a range of values to solve an inequality on a number line.	I know when to use open and filled circles on a number line when representing a solution to an inequality. I can use a number line to find the set of values that are true for two inequalities.
19	To use graphs to convey direct proportion.	I understand the term 'continuous data.'	I can use information in a graph to make comparisons. I can use scale factors effectively, I can interpret scale diagrams such as maps.	I can explore direct proportion graphs and draw my own conclusions using relevant proof and reasoning.
20	To multiply and divide with fractions and mixed numbers.	I can multiply two proper fractions. I know that multiplication is commutative.	I can convert between mixed numbers and improper fractions. I can increase and decrease amounts using a multiplier. I can divide fractions by fractions or integers.	I can find an original amount given the fraction greater or less than one whole.
21	To solve problems involving percentage change, including original value problems.	I know that 100% represents a whole. I can find 10%, 1% and 50% of an amount.	I can express one number as a fraction or percentage of another. I can calculate percentage change using a calculator.	I can find an original amount given the percentage greater or less than 100%
22	To calculate the interior and exterior angles of polygons	I can accurately measure angles up to 180 degrees I know that angles in a triangle have a sum of 180 degrees I know that angles in a quadrilateral have a sum of 360 degrees	I can explain the relationship between interior angles in a triangle and a quadrilateral. I can calculate the interior angles of polygons. I can calculate exterior angles of polygons.	I can investigate and prove simple geometric facts.
23	To use ruler and compass methods to construct the perpendicular bisector of a line segment and bisect an angle.	I understand why I need to use construction techniques. I can use compasses to construct clean arcs.	I use a ruler and compasses to construct the perpendicular bisector of a line segment. I can use ruler and compasses to bisect an angle.	I can use construction techniques to construct accurate 2-D shapes; e.g. triangles, rhombus.
24	To calculate the area of triangles, rectangles, parallelograms, trapeziums and compound shapes.	I know that the formula for calculating the area of a quadrilateral is BXH I understand the term 'perpendicular height.'	I can give the formula for calculating the area of a triangle, rectangle and parallelogram. I can calculate the area of trapezia. I can calculate the area of compound shapes including rectilinear shapes.	I can explore the relationship between area and perimeter of compound shapes.
25	To calculate the surface area of cubes and cuboids.	I can visualise the surface of a cuboid. I can use the formula for the area of a rectangle.	I can find the surface area of a cuboid when the three dimensions are shown. I can state the correct units for a solution to a problem.	I can use the surface area of a cuboid to find a missing dimension in a cuboid.
26	To calculate the volume of cubes, cuboids and prisms.	I can identify some 3D shapes by name. I can list some properties of 3D shapes.	I can substitute measurements into a formula to calculate the volume of cubes and cuboids. I can use my understanding of area to help me to calculate the volume of prisms.	I can explore the relationship between surface area and volume. I can explore volumes of cones, pyramids and spheres.

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27	To know and apply the formulae for circumference and area of a circle.	I can recall Pi to 2dp. I recall the formula for area and circumference of a circle. I can find the diameter when the radius is given and vice versa.	I can find the area and circumference of a circle rounding answers appropriately. I can use a scientific calculator when solving problems involving circles.	I can find the diameter of a circle when the circumference is given. I can find radius of a circle when the area is given. I can find the area and perimeter of composite shapes including parts of circles.
28	To construct accurate graphs and tables and analyse results.	I can construct a range of graphs and tables appropriate for the data type and draw conclusions.	I can construct stem and leaf diagrams (including back to back) and use them to find the mode, median, mean and range of the data.	I recognise the distribution curve in a stem and leaf diagram and can interpret this appropriately. I can identify misleading graphs.
29	To find the mode, median, mean and range of data in tables.	I can identify the mode, median and range of a data set. I understand 'Mean' as the numerical average.	I can extract data from tables to find the mode, median, mean and range. I recognise and extract information from grouped data in tables and graphs.	I can find the range, modal class interval, median class interval and an estimate of the mean of grouped data presented in tables and charts.
30	To construct and interpret scatter graphs and frequency polygons.	I understand that continuous data can be presented in scatter graphs and frequency polygons.	I can construct and interpret scatter graphs. I can construct and interpret frequency polygons.	I can describe the correlation in data sets shown in scatter graphs. I make predictions based on the results in scatter graphs and frequency polygons.
31	To use the centre and scale factor to carry out an enlargement with positive integer and fractional scale factors.	I understand the term scale factor. I understand that enlargements are created from a centre of enlargement.	I can use a positive or fractional integer scale factor to enlarge or reduce a regular polygon. I identify the centre of enlargement from images of an object and its enlarged image.	I can calculate the scale factor used when looking at an object and its enlarged image. I can enlarge irregular objects and images using a positive scale factor.
32	To know how to construct the locus of points a fixed distance from a point or line.	I understand the meaning of locus (Loci)	I identify when a perpendicular bisector is needed to solve a loci problem. I identify when an angle bisector is needed to solve a loci problem.	I can combine techniques to solve more complex loci problems.
33	To apply Pythagoras' theorem in two dimensions.	I can identify the hypotenuse in a right-angled triangle I can recall Pythagoras' theorem as $a^2 + b^2 = c^2$.	I can calculate the hypotenuse of a triangle using Pythagoras' theorem. I can calculate one of the shorter sides of a right-angled triangle using Pythagoras' theorem.	I use Pythagoras' theorem to find missing sides in any triangle including, when necessary, by forming right angled triangles within isosceles and scalene triangles.