

End of Year 6 Mathematics expectations

Calculation policy	To be able to add numbers with differing numbers of places (including adding place-holding zeros)
	To add more than two complex numbers
	To be able to subtract numbers with differing numbers of places (including adding place holding zeros)
	To multiply multi-digit numbers (up to 4 digits) by a two-digit whole number using long multiplication
	To multiply one digit numbers with up to two decimal places by whole numbers
	To multiply more complex numbers (using knowledge of place value and estimation)
	To divide numbers up to 4 digits by a two-digit number using short division
	To divide numbers with up to two decimal places by whole numbers
	To use written division methods where the answer has up to 2 decimal places
	To interpret remainders as whole number remainders, fractions, decimals or by rounding, as appropriate for the context
To divide numbers giving answers to set numbers of decimal places (including interpreting reoccurring numbers)	
Mental calculations	To perform mental calculations, including with mixed operations and large numbers
	To use commutative and distributive properties to aid mental calculation
	To rehearse all multiplication tables to maintain speed and accuracy
	To recognise division as the inverse of multiplication
Calculating	To solve addition and subtraction multi-step problems in contexts
	To use formal methods to solve problems involving all four operations (including the use of fractions, decimals and real life contexts)
	To use formal methods to solve multistep problems (including the use of fractions, decimals and real life contexts)
	To solve complex multi-step problems involving a range of mathematical skills and knowledge
	To solve missing number problems involving all four operations
	To use knowledge of the order of operations to carry out calculations (involving the four operations)
	To use understand the order of operation (BIDMAS)
	To solve number and practical problems which require answers to be rounded to specified degrees of accuracy
	To solve number and practical problems which involve negative numbers
To apply my knowledge by solving mathematical puzzles and investigations	
To use estimation to check answers to calculations	
Place value	To read and write numbers up to 10 000 000
	To order and compare numbers up to 10 000 000
	To know the value of each digit in numbers up to 10 000 000
	To read and write numbers down to 0.001
	To order and compare numbers down to 0.001
	To know the value of each digit in numbers down to 0.001
	To find the difference between the largest and smallest whole number that can be made from three digits
	To multiply and divide numbers by 10, 100 and 1000 (giving answers up to three decimal places)
	To divide decimals by 1 digit whole numbers (including in different contexts)
	To use knowledge of times tables to multiply multiples of 10 (including decimals)
Number system	To complete more complex number sequences (including fractions, negative numbers and decimals)
	To describe the rule of more complex number sequences (including fractions, negative numbers and decimals)
	To predict numbers in and out of more complex number sequences
	To justify why a rule must always be true or disprove it with examples
	To round any whole number to a required degree of accuracy (including to the nearest 10, 20, 50 and decimal place)
	To calculate decimal compliments to 1, 10 or 100
	To identify common factors, common multiples and prime numbers
	To recognise square up to 12×12 and calculate squares beyond (using the correct symbol)
	To know some squares and square roots for numbers and be able to calculate some cubes
	To count forward or backward from any starting point including crossing zero (including decimals)
	To add and subtract negative numbers (including in different contexts - using a numberline initially)
	To find the difference between positive and negative integers (including in different contexts)
	To calculate intervals across zero
To read and write Roman Numerals to 10,000, with quick recognition of year dates	
Fractions	To find increasingly more difficult unit and non-unit fractions of quantities
	To use common factors to simplify fractions
	To use common multiples to express fractions in the same denomination ($\frac{1}{2}$ and $\frac{1}{3} \rightarrow \frac{3}{6}$ and $\frac{2}{6}$)
	To link common factors and multiples to finding equivalent fractions
	To compare and order fractions, including fractions > 1
	To add fractions with different denominators using the concept of equivalent fractions
	To subtract fractions with different denominators using the concept of equivalent fractions
	To add mixed numbers using the concept of equivalent fractions
	To subtract mixed numbers using the concept of equivalent fractions
	To multiply simple pairs of proper fractions, writing the answer in its simplest form
	To multiply fractions by whole numbers (linking to finding a fraction 'of' a number)
	To divide proper fractions by whole numbers
	To divide fractions by other fractions
	To divide in order to find decimal fraction equivalents for simple fractions (e.g. $0.375 = \frac{3}{8}$)
To work backwards from unit fraction to find the whole quantity	

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Decimals and Percentages	To recall and calculate equivalences between simple fractions, decimals and percentages
	To calculate using fractions, decimals and percentages (including in different contexts)
	To order fractions, decimals and percentages through converting them into a common form
	To solve problems involving the calculation of percentages
	To link percentages to calculating angles of pie charts
	To use percentages for comparison
Ratio and proportion	To solve simple problems involving missing values using scaling methods (integer multiplication and division)
	To solve simple problems involving ratio and proportion using scaling methods
	To identify the scale factor in a simple problem or drawing
	To solve problems involving similar shapes where the scale factor is known or can be calculated
Algebra	To represent unknown quantities using letters or symbols
	To use simple formulae using all four operations
	To substitute values into algebraic expressions
	To solve algebraic expressions to find missing values (linear, brackets, fractions and some simple quadratics)
	To generate and describe linear number sequences algebraically
	To express missing number problems algebraically
	To understand equivalent expressions (e.g. $a + b = b + a$)
	To find pairs of numbers that satisfy an equation with two unknowns
To enumerate possibilities of combinations of two variables	
Measure	To read and write standard units (length, mass, volume and time - up to 3 decimal places)
	To convert between standard units (length, mass, volume and time - up to 3 decimal places)
	To solve problems involving the calculation of units of measure (up to 3 decimal places)
	To solve problems involving converting between units (length, mass, volume and time - up to 3 decimal places)
	To solve problems involving calculating time intervals (over an hour)
	To convert between miles and kilometres
	To solve problems using conversion graphs (converting between metric and imperial)
Shape	To compare and classify geometric shapes based on their properties (including angles, symmetry, parallel and perpendicular lines)
	To recognize and describe simple 3-D shapes
	To build simple 3-D shapes
	To create accurate nets of 3D shapes
	To explain how unknown lengths and angles can be derived from known measurements
	To illustrate and name parts of circles (including radius, diameter and circumference)
	To know that the diameter of a circle is twice the radius
	To draw 2D shapes using given dimensions and angles
	To substitute values into a simple formula to solve problems (perimeter of a rectangle, volume of a cuboid or area of a triangle)
Area, Perimeter and volume	To recognise that shapes with the same areas can have different perimeters and vice versa
	To calculate the area of parallelograms
	To calculate the area of triangles
	To find areas of parallelograms by splitting into triangles and rectangles
	To estimate volumes of cubes and cuboids
	To calculate volumes of cubes and cuboids
	To compare volumes of cubes and cuboids
	To recognise when it is possible to use formulae for area and volume of shapes
Angles	To calculate unknown angles where they meet at a point
	To calculate unknown angles on a straight line
	To calculate unknown angles where they are vertically opposite
	To calculate missing angles in shapes (isosceles and other triangles and quadrilaterals) and in more complex diagrams (around a point of vertically opposite)
	To use a protractor to draw acute and obtuse angles to the nearest degree
	To accurately measure angles in degrees ($^{\circ}$)
Position and direction	To describe positions on the full coordinate grid (all four quadrants)
	To draw and label coordinate axis with equal scaling (including negative numbers)
	To draw simple shapes on the coordinate plane
	To translate simple shapes on the coordinate plane (including using algebraic representations for a vertex)
	To reflect simple shapes in the axis
	To predict the unknown coordinates of simple shapes on a coordinate plane
Statistics	To interpret line graphs and pie charts and use these to solve problems (including using knowledge of fractions, decimals and percentages)
	To construct line graphs and use these to solve problems
	To construct pie charts and use these to solve problems
	To calculate the mean as an average
	To interpret the mean of a set of data
	To draw and interpret graphs relating to two variables arising from their own study