

Stage 7

N Number

Ni Integers, powers and roots

- **7Ni1** Recognise negative numbers as positions on a number line, and order, add and subtract positive and negative integers in context
- **7Ni2** Recognise multiples, factors, common factors, primes (all less than 100), making use of simple tests of divisibility; find the lowest common multiple in simple cases; use the 'sieve' for generating primes developed by Eratosthenes
- **7Ni3** Recognise squares of whole numbers to at least 20×20 and the corresponding square roots; use the notation 7^2 and $\sqrt{49}$

Np Place value, ordering and rounding

- **7Np1** Interpret decimal notation and place value; multiply and divide whole numbers and decimals by 10, 100 or 1000
- **7Np2** Order decimals including measurements, changing these to the same units
- **7Np3** Round whole numbers to the nearest 10, 100 or 1000 and decimals, including measurements, to the nearest whole number or one decimal place

Nf Fractions, decimals, percentages, ratio and proportion

- **7Nf1** Recognise the equivalence of simple fractions, decimals and percentages
- **7Nf2** Simplify fractions by cancelling common factors and identify equivalent fractions; change an improper fraction to a mixed number, and vice versa; convert terminating decimals to fractions, e.g. $0.23 = \frac{23}{100}$
- **7Nf3** Compare two fractions by using diagrams, or by using a calculator to convert the fractions to decimals, e.g. $\frac{3}{5}$ and $\frac{13}{20}$
- **7Nf4** Add and subtract two simple fractions, e.g. $\frac{1}{8} + \frac{9}{8}$, $\frac{11}{12} - \frac{5}{6}$; find fractions of quantities (whole number answers); multiply a fraction by an integer
- **7Nf5** Understand percentage as the number of parts in every 100; use fractions and percentages to describe parts of shapes, quantities and measures
- **7Nf6** Calculate simple percentages of quantities (whole number answers) and express a smaller quantity as a fraction or percentage of a larger one
- **7Nf7** Use percentages to represent and compare different quantities
- **7Nf8** Use ratio notation, simplify ratios and divide a quantity into two parts in a given ratio
- **7Nf9** Recognise the relationship between ratio and proportion
- **7Nf10** Use direct proportion in context; solve simple problems involving ratio and direct proportion

Nc Calculation

Mental strategies

- **7Nc1** Consolidate the rapid recall of number facts, including positive integer complements to 100, multiplication facts to 10×10 and associated division facts
- **7Nc2** Use known facts and place value to multiply and divide two-digit numbers by a single-digit number, e.g. 45×6 , $96 \div 6$
- **7Nc3** Know and apply tests of divisibility by 2, 3, 5, 6, 8, 9, 10 and 100

- **7Nc4** Use known facts and place value to multiply simple decimals by one-digit numbers, e.g. 0.8×6
- **7Nc5** Calculate simple fractions and percentages of quantities, e.g. one quarter of 64, 20% of 50 kg
- **7Nc6** Use the laws of arithmetic and inverse operations to simplify calculations with whole numbers and decimals
- **7Nc7** Use the order of operations, including brackets, to work out simple calculations

Addition and subtraction

- **7Nc8** Add and subtract integers and decimals, including numbers with different numbers of decimal places

Multiplication and division

- **7Nc9** Multiply and divide decimals with one and/or two places by single-digit numbers, e.g. 13.7×8 , $4.35 \div 5$
- **7Nc10** Know that in any division where the dividend is not a multiple of the divisor there will be a remainder, e.g. $157 \div 25 = 6$ remainder 7. The remainder can be expressed as a fraction of the divisor, e.g. $157 \div 25 = 6\frac{7}{25}$
- **7Nc11** Know when to round up or down after division when the context requires a whole-number answer

A Algebra

Ae Expressions, equations and formulae

- **7Ae1** Use letters to represent unknown numbers or variables; know the meanings of the words *term*, *expression* and *equation*
- **7Ae2** Know that algebraic operations follow the same order as arithmetic operations
- **7Ae3** Construct simple algebraic expressions by using letters to represent numbers
- **7Ae4** Simplify linear expressions, e.g. collect like terms; multiply a constant over a bracket
- **7Ae5** Derive and use simple formulae, e.g. to change hours to minutes
- **7Ae6** Substitute positive integers into simple linear expressions/formulae
- **7Ae7** Construct and solve simple linear equations with integer coefficients (unknown on one side only), e.g. $2x = 8$, $3x + 5 = 14$, $9 - 2x = 7$

As Sequences, functions and graphs

- **7As1** Generate terms of an integer sequence and find a term given its position in the sequence; find simple term-to-term rules
- **7As2** Generate sequences from spatial patterns and describe the general term in simple cases
- **7As3** Represent simple functions using words, symbols and mappings
- **7As4** Generate coordinate pairs that satisfy a linear equation, where y is given explicitly in terms of x ; plot the corresponding graphs; recognise straight-line graphs parallel to the x - or y -axis

G Geometry

Gs Shapes and geometric reasoning

- **7Gs1** Identify, describe, visualise and draw 2D shapes in different orientations
- **7Gs2** Use the notation and labelling conventions for points, lines, angles and shapes
- **7Gs3** Name and identify side, angle and symmetry properties of special quadrilaterals and triangles, and regular polygons with 5, 6 and 8 sides
- **7Gs4** Estimate the size of acute, obtuse and reflex angles to the nearest 10°
- **7Gs5** Start to recognise the angular connections between parallel lines, perpendicular lines and transversals
- **7Gs6** Calculate the sum of angles at a point, on a straight line and in a triangle, and prove that vertically opposite angles are equal; derive and use the property that the angle sum of a quadrilateral is 360°
- **7Gs7** Solve simple geometrical problems by using side and angle properties to identify equal lengths or calculate unknown angles, and explain reasoning
- **7Gs8** Recognise and describe common solids and some of their properties, e.g. the number of faces, edges and vertices
- **7Gs9** Recognise line and rotation symmetry in 2D shapes and patterns; draw lines of symmetry and complete patterns with two lines of symmetry; identify the order of rotation symmetry
- **7Gs10** Use a ruler, set square and protractor to:
 - measure and draw straight lines to the nearest millimetre
 - measure and draw acute, obtuse and reflex angles to the nearest degree
 - draw parallel and perpendicular lines
 - construct a triangle given two sides and the included angle (SAS) or two angles and the included side (ASA)
 - construct squares and rectangles
 - construct regular polygons, given a side and the internal angle

Gp Position and movement

- **7Gp1** Read and plot coordinates of points determined by geometric information in all four quadrants
- **7Gp2** Transform 2D points and shapes by:
 - reflection in a given line
 - rotation about a given point
 - translation

Know that shapes remain congruent after these transformations

G Measure

G1 Length, mass and capacity

- 7G11** • **7M11** Choose suitable units of measurement to estimate, measure, calculate and solve problems in everyday contexts
- 7G12** • **7M12** Know abbreviations for and relationships between metric units; convert between:
 - kilometres (km), metres (m), centimetres (cm), millimetres (mm)
 - tonnes (t), kilograms (kg) and grams (g)
 - litres (l) and millilitres (ml)
- 7G13** • **7M13** Read the scales on a range of analogue and digital measuring instruments

Gt Time and rates of change

- 7Gt1** • **7Mt1** Draw and interpret graphs in real life contexts involving more than one stage, e.g. travel graphs
- 7Gt2** • **7Mt2** Know the relationships between units of time; understand and use the 12-hour and 24-hour clock systems; interpret timetables; calculate time intervals

Ga Area, perimeter and volume

- 7Ga1** • **7Ma1** Know the abbreviations for and relationships between square metres (m^2), square centimetres (cm^2), square millimetres (mm^2)
- 7Ga2** • **7Ma2** Derive and use formulae for the area and perimeter of a rectangle; calculate the perimeter and area of compound shapes made from rectangles
- 7Ga3** • **7Ma3** Derive and use the formula for the volume of a cuboid; calculate volumes of cuboids
- 7Ga4** • **7Ma4** Calculate the surface area of cubes and cuboids from their nets

D Handling data**Dc Planning and collecting data**

- **7Dc1** Decide which data would be relevant to an enquiry and collect and organise the data
- **7Dc2** Design and use a data collection sheet or questionnaire for a simple survey
- **7Dc3** Construct and use frequency tables to gather discrete data, grouped where appropriate in equal class intervals

Dp Processing and presenting data

- **7Dp1** Find the mode (or modal class for grouped data), median and range
- **7Dp2** Calculate the mean, including from a simple frequency table
- **7Dp3** Draw and interpret:
 - bar-line graphs and bar charts
 - frequency diagrams for grouped discrete data
 - simple pie charts
 - pictograms

Di Interpreting and discussing results

- **7Di1** Draw conclusions based on the shape of graphs and simple statistics
- **7Di2** Compare two simple distributions using the range and the mode, median or mean

Db Probability

- **7Db1** Use the language of probability to describe and interpret results involving likelihood and chance
- **7Db2** Understand and use the probability scale from 0 to 1
- **7Db3** Find probabilities based on equally likely outcomes in simple contexts
- **7Db4** Identify all the possible mutually exclusive outcomes of a single event
- **7Db5** Use experimental data to estimate probabilities
- **7Db6** Compare experimental and theoretical probabilities in simple contexts

Problem solving

Using techniques and skills in solving mathematical problems

- **7Pt1** Use the laws of arithmetic and inverse operations to simplify calculations with whole numbers and decimals
- **7Pt2** Manipulate numbers, algebraic expressions and equations, and apply routine algorithms
- **7Pt3** Understand everyday systems of measurement and use them to estimate, measure and calculate
- **7Pt4** Recognise and use spatial relationships in two and three dimensions
- **7Pt5** Draw accurate mathematical diagrams, graphs and constructions
- **7Pt6** Check results of calculations by using inverse operations
- **7Pt7** Estimate, approximate and check their working
- **7Pt8** Solve word problems involving whole numbers, percentages, decimals, money or measures: choose operations and mental or written methods appropriate to the numbers and context, including problems with more than one step

Using understanding and strategies in solving problems

- **7Ps1** Identify and represent information or unknown numbers in problems, making correct use of numbers, symbols, words, diagrams, tables and graphs
- **7Ps2** Recognise mathematical properties, patterns and relationships, generalising in simple cases
- **7Ps3** Work logically and draw simple conclusions
- **7Ps4** Relate results or findings to the original context and check that they are reasonable
- **7Ps5** Record and explain methods, results and conclusions
- **7Ps6** Discuss and communicate findings effectively, orally and in writing