

Year 7 – Unit 1 - number properties 1

Foundation

Order whole numbers using a number line. Place integers and decimals in order of size.
Multiply and divide integers and decimals by 10,100, 1000 and explain the effect.
Multiplying and dividing by a single-digit number using written methods.
Multiplying by two digit number using written methods.
Use standard column procedures to add and subtract integers and simple decimals.

Secure

Convert between decimals, fractions and integers
Order decimals and fractions using appropriate symbols.
Place integers, decimals and directed numbers in order of size.
Mental and written methods for all four operations with integers using a calculator where appropriate
Use of BIDMAS

Extending

Understand place value in big numbers and decimals.
Be able to put the symbols =, ≠, <, >, ≤, ≥ between pairs of numbers.
Be able to put two or more simple fractions in order by using equivalence
Strengthen mental and written methods working with squares/ cubes and roots.
Round whole numbers and to the nearest 10, 100, 1000
Check results by considering order of magnitude and use inverse operations

Challenge

Division, multiplication, addition and subtraction of fractions.
Place integers, decimals, fractions and directed numbers in order of size including where fraction to decimal conversion needs to be done.
Use written methods for 4 rules of integers, decimals to 3 or 4 decimal places, directed numbers and fractions.
Be able to order fractions with different denominators and find a fraction bigger than $\frac{7}{8}$ but less than one.
Be able to find a fraction half way between two others.

Year 7 - Unit 2 - Geometry and Measures

Foundation

Understand how to measure angles using the protractor and construct angles.

Learn to describe the different types of angles; right angle, acute, obtuse and reflex and the correct notation.

Understand that angles on a straight line total 180° which allows them to find missing angles on a straight line.

Understand that angles around a point totals 360° which allows them to find a missing angle around a point. Understand why vertically opposite angles are equal and use this knowledge to find missing angles.

Pupils need to be able to convert standard units of measurements, money and time.

Secure

Learn that the interior angles of a triangle totals 180° . Discover the properties of the equilateral and isosceles triangle and the impact of equal lengths on the angles.

Extending

Use units of measurement to estimate, calculate and solve problems in everyday contexts involving length, area, volume, capacity, mass, time, angle and bearings; convert one metric unit to another, e.g. grams to kilograms; know rough metric equivalents of imperial measures in daily use (feet, miles, pounds, pints, gallons); read and interpret scales on a range of measuring instruments.

Investigate the effect of equal lengths on angles in isosceles and equilateral triangles. Continue this investigation with other regular polygons.

Challenge

Investigate the relationship of angles between parallel lines. Learn that alternate and corresponding angles are derived from the relationship between the transversal as it cuts through parallel lines.

Solve problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons, justifying and explaining reasoning with diagrams and text.

Investigate the properties of 3D shapes to find Euler's Rule that $V - E + F = 2$ where V = vertices, E = edges and F = faces.

Learn how to draw the nets of cylinders, pyramids and cones.

Using the knowledge of nets, explore how to find the total surface area and volume of 3D shapes.

Pupils are able to convert different units (metric and imperial) of length, mass and capacity. They are able to round decimal numbers to a specified degree of accuracy.

Year 7 – Unit 3 – Number Properties 3

Foundation

Identify a pattern of numbers within a 1-100 grid and use this to describe how to continue the pattern beyond the grid.

Identify factors of two-digit numbers.

Find the first ten multiples of numbers 1-10.

Find common multiples (e.g. for 6 and 9).

Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit numbers.

Use knowledge of multiplication facts to derive quickly squares of numbers to 12×12 and the corresponding squares of multiples of 10.

Secure

Recognise and use multiples, factors, primes (less than 100), common factors, highest common factors and lowest common multiples in simple cases.

Use simple tests of divisibility.

Recognise the first few triangular numbers, squares of numbers to at least 12×12 and the corresponding roots.

Extending

State the meaning of the term factor/ identify factors of a given number.

Define prime numbers / identify prime numbers.

Find common factors - identify the highest common factor for a simple pair of numbers.

Identify the prime factors for a specified number.

Express a number as a product of its prime factors. Identify multiples and find the lowest common multiple for a simple pair of numbers.

Identify multiples and find the lowest common multiple for a simple set of numbers.

Challenge

Find common factors for a set of numbers and identify highest common factor.

Identify common multiples for a set of numbers and find lowest common multiple for a set of numbers.

Year 7 – Unit 4 – Algebra 1

Foundation and Secure

Collect like terms. E.g. $a + a + b + 2b = 2a + 3b$.

Use indices like $a \times a \times a = a^3$ and $b \times b = b^2$.

Use a/b instead of $a \div b$.

Substitute mainly positive integers into formulae and expressions.

Extension could be to substitute negative integers into formulae and expressions.

Extension could be to substitute fractions and decimals into formulae and expressions.

Extending

Substitute mainly positive integers into formulae and expressions.

Substitute negative integers into formulae and expressions including expressions with squared terms.

Challenge

Could be to substitute fractions and decimals into formulae and expressions.

Use of formulae for perimeter and area of standard shapes.

Use of formulae for volume of standard prisms.

Year 7 – Unit 5 – Fractions, Decimals and Percentages

Foundation

USING SIMPLE FRACTIONS: Know that FDP can be interchanged.
Convert percentage to fraction and decimal and compare the magnitude of results.
Calculate percentage of an amount.
Shade in percentage of a shape.
Express one quantity as a percentage of another.

Secure

Know that FDP can be interchanged.
Convert percentage to fraction and decimal and compare the magnitude of results.
Calculate percentage of an amount.
Shade in percentage of a shape.
Express one quantity as a percentage of another.

Extending

Know that fractions, percentages and decimals can be interchanged.
Use fraction, percentages and decimals to compare proportions.
Convert between fractions, percentages and decimals to answer questions.
Identify fraction of a shape.
Identify fraction of an amount.
Recognise fractions less than 1.

Challenge

Finding a percentage of a number without a calculator.
Increase and decrease by a percentage without a calculator.
Finding 50%, 25%, 10%, 5% using these to find other percentages.
Solve problems involving percentage change.
Know that fractions, percentages and decimals can be interchanged.
Use fraction, percentages and decimals to compare proportions.
Convert between fractions, percentages and decimals to use the most appropriate method in any given question.
Original value problems and simple interest in financial mathematics.
Working out the price after VAT.
Working out income after tax.
Working out the value of savings after a period of compound interest.
Identify fraction of a shape.
Identify fraction of an amount.
Recognise fractions less than 1.
Recognise fractions greater than 1.

Year 7 – Unit 6 – Approximations

Foundation

Round numbers to the nearest integer, 10, 100, 1000.
Round to a given number of decimal places.

Secure

Round numbers to the nearest integer, 10, 100, 1000.
Round to a given number of decimal places.
Round to a given number of significant figures.

Extending

Round numbers to the nearest integer, 10, 100, 1000.
Round to a given number of decimal places.
Round to a given number of significant figures.
Interpret calculator displays; check that answers are sensible using estimation.

Challenge

Round numbers to the nearest integer, 10, 100, 1000.
Round to a given number of decimal places.
Round to a given number of significant figures.
Estimate answers to calculations using rounding to 1sf.
Solve worded estimation problems.
Use a calculator to enter complex calculations and round the answer to a given degree of accuracy.

Year 7 – Unit 7 – Algebra 2

Foundation

Understand and use the vocabulary of expression, equation and term.

Collect simple like terms, with terms involving one letter, i.e. $3a + 2y + a + y$.

Solve linear equations with unknown represented by a symbol, i.e. $[] + 3 = 10$

Secure

Understand and use the vocabulary of expression, equation and term.

Collect like terms, with terms involving one letter, i.e. $3a + 2y + a + y$.

Expand a single bracket with number outside bracket, i.e. $3(2a + 5)$.

Solve linear equations with unknown represented as a letter.

Extending

Understand and use the vocabulary of expression, equation, term and factor.

Collect like terms, with terms involving one letter, i.e. $3a + 2y + a + y$.

Simplify simple expressions involving powers.

Expand a single bracket with number outside bracket, i.e. $3(2a + 5)$.

Solve linear equations with unknown on one side including brackets

Challenge

Understand and use the vocabulary of expression, equation, term and factor.

Simplify expressions involving sums products and powers.

Expand single bracket with letter and number outside bracket.

Factorise single bracket with letter and number as common factor.

Expand double bracket to give quadratic expression of form $x^2 + bx + c$.

Solve linear equations with unknown on both sides and brackets.

Year 7 – Unit 8 – Collecting and Interpreting Data

Foundation and Secure

Be able to construct and interpret a pictogram, bar chart and vertical line diagram for ungrouped data.

Know the difference between qualitative and quantitative data and which diagram is the most appropriate to use.

Use a protractor to measure angles accurate to 1 degree.

Know angles around a point add up to 360 degrees.

Find the mean, mode and median from a list of numbers (odd number of data values).

Extending

Construct and interpret pie charts.

Construct and interpret vertical line diagrams for grouped discrete data.

Describe, compare and interpret using mean, median, mode and range of small discrete data sets.

Explain when and why it is appropriate to use mean or mode or median using certain data sets.

Understand that the median is the middle piece of data if there are an odd number of pieces of data that it is the mean of the two middle pieces of data if there is an even number of pieces of data and that the data needs to be ordered when finding the median or range.

Challenge

Be able to construct frequency tables where discrete data is grouped.

Be able to find the mean when discrete data is represented in a frequency table.

Be able to estimate the mean when data is discrete and grouped and represented in a frequency table.

Be able to construct and interpret two way tables, Venn Diagrams and line graphs for time series data.

Year 7 – Unit 9 – sequences and patterns

Foundation

Recognise and continue number sequences.
Describe and continue number sequences.

Secure

Be able to generate a sequence by spotting a pattern or using a term-to-term rule given algebraically or in words. e.g. Continue the sequences 1, 4, 7, 10, ... 1, 4, 9, 16,

Find a position-to-term rule for simple arithmetic sequences, algebraically or in words. e.g.: 2, 4, 6, 8, 10, ... $2n$, 3, 4, 5, 6, 7, ... $n + 2$.

Recognise sequences, triangular, square and cube numbers and simple arithmetic progressions.

Generate sequences from practical contexts.

Generate coordinate pairs that satisfy a simple rule. Make connections with the position and the terms in the sequence. Plot the graphs of simple linear functions. Solve problems and spot patterns in coordinates.

Extending

Use linear expressions to describe the n th term of a simple arithmetic sequence.

Recognise sequences, triangular, square and cube numbers and simple arithmetic progressions.

Generate coordinate pairs that satisfy a simple rule.

Make connections with the position and the terms in the sequence.

Plot the graphs of simple linear functions.

Plot and interpret the graphs of simple linear functions arising from real-life.

Be able to plot co-ordinates in all four quadrants of a graph.

Be able to recognise patterns with co-ordinates on a graph.

Be able to recognise a sequence of numbers and explain what the rule is to get from one term to the next; i.e. Add 5 (arithmetic) or multiply by 4 (geometric).

Challenge

Generate a sequence by spotting a pattern or using a term-to-term rule given algebraically or in words e.g. Continue the sequences 1, 4, 7, 10, ..., 1, 4, 9, 16, ...

Find a position-to-term rule for simple arithmetic sequences, algebraically or in words, e.g. 2, 4, 6, ... $2n$ or

3, 4, 5, ... $n + 2$

Recognise sequences, triangular, square and cube numbers and simple arithmetic progressions. Know and recognise the following sequences of numbers; triangular, square numbers, cube numbers, the Fibonacci sequence.

Using a term-to-term rule (e.g, add 6) generate the different terms of a sequences.

Using a position-to-term rule (e.g. $6n - 4$) generate the different terms of a sequence.

Year 7 – Unit 10 – Proportion

Foundation and secure

Understand what a ratio actually means.

Reduce a ratio to its lowest form.

Understand equivalent ratios.

Divide quantities in a given ratio with and without a calculator.

Understand how to compare proportions when given a ratio of two quantities.

Convert between simple families of fractions and decimals (Halves, quarters, fifths and tenths) Able to divide therefore writing a fraction as a decimal. Know the basic fraction/decimal conversions i.e. $\frac{1}{10} = 0.1$

State the purpose of a ratio.

Simplify ratio.

Extending

Use the ratio 1 : n for use with map scales and plans.

Answer questions like: If the ratio of girls to boys in a class is 7: 9 and there are 14 girls, how many boys are there?

Convert between families of fractions and decimals (only simple recurring decimals).

Divide quantities in a given ratio.

Use ratio to calculate amounts

State the meaning of the term proportion.

Calculate using proportional amounts - the unitary method..

Year 7 – Unit 11 – Ratio and Scale

Foundation and secure

Interpret scales on a range of measuring instruments, and recognise the inaccuracy of measurements. Interpret scales on a range of measuring instruments including mm, cm, m, km, ml, cl, l, mg, g, kg, tonnes.

Measure and draw lines with a ruler and measure and draw angles with a protractor.

Construct scale drawings.

Use and interpret scale drawings.

Interpret map/model scales as a ratio.

Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides.

Extending

Construct scale drawings.

Use and interpret scale drawings, Interpret scales on a range of measuring instruments including mm, cm, m, km, ml, cl, l, mg, g, kg, tonnes, °C.

Interpret map/model scales as a ratio and estimate lengths using a scale diagram. Give a bearing between the points on a map or scaled plan, interpret bearing and scaled drawings.