



# MATHEMATICS - YEAR 9

## Number:

Order integers and decimals using correct symbols. Addition, subtraction, multiplication and division. BIDMAS.

Decimal notation and place value. Add, subtract, divide and multiply decimals. Rounding to decimal places and significant figures. Estimation. Use one answer to find the answer to another.

Square and cube numbers. Recognise powers of 2,3,4 and 5. Roots. Add, subtract, multiply and divide in index form. Using a calculator for roots and power. BIDMAS with powers and roots.

Identify factors, multiples and prime numbers. List all factors of a number systematically. Prime factor decomposition of a number. Find HCF and LCM using multiple methods including Venn diagrams.

## Data Handling:

Data collection techniques. Interpret and discuss data. Sort, classify and tabulate data including discrete, continuous, quantitative and qualitative. Averages. Two-way tables. Averages from frequency and grouped frequency tables.

Coordinates. Pictograms. Bar charts. Line graphs. Histograms (equal width). Stem and leaf diagram.

Draw circles and arcs, Measure and draw angles. Construct pie charts. Interpret pie charts.

Draw scatter graphs. Interpret scatter graphs and identify outliers. Draw lines of best fit and use them to make predictions.

## Algebra:

Use function machines. Set up and solve simple equations. Solve more advanced equations with brackets and unknowns on both sides. Rearrange simple equations. Approximate results of equations using a graph.

Inequalities on number line. Solve inequalities and give integer values that satisfy them. Solve multiple inequalities to find a value that satisfies them all.

Recognise sequences including Fibonacci sequences. Find terms of a sequence. Nth term of a linear sequence. Continue a geometric and quadratic sequence to generate missing terms.

## Algebra:

Write an expression. Simplify algebraic expressions. Multiply algebraic expressions. Divide algebraic expressions. Use index laws in algebra.

Multiply a single number over a bracket. Simplify expressions involving brackets. Factorise algebraic expressions by taking out common factors.

Write expressions to solve problems representing a situation. Substitute numbers into expressions.

## Number:

Express a given number as a fraction of another. Simplify fractions and recognise equivalent fractions. Order fractions with different denominators. Convert between mixed numbers and improper fractions. Add, subtract, multiply and divide fractions.

Convert between fractions. Percentages and decimals. Convert fractions into recurring decimals. Compare and order fractions, percentages and decimals. Percentage as fraction.

Express a given number as a percentage of another. Find percentages without using a calculator. Solve problems with percentages. Work out a percentage increase/ decrease. Use a calculator to find percentages using multipliers.

## Shape and Space:

Estimate sizes of an angle Measure angles using a protractor. Identify perpendicular and parallel lines. Recall properties of quadrilaterals. Angles at a point, straight line, right angle, alternate angles, corresponding angles and vertically opposite angles.





# MATHEMATICS HIGHER - YEAR 9

## Number:

Add, subtract, divide and multiply decimals. Use one answer to find the answer to another. Product rule for counting. Rounding to decimal places and significant figures. Estimation.

Index notation for powers including negative and fractional powers. Using a calculator for roots and power. Estimate roots. BIDMAS with powers and roots.

Identify factors, multiples and prime numbers. List all factors of a number systematically. Prime factor decomposition of a number. Find HCF and LCM using multiple methods including Venn diagrams.

Convert between standard form and normal numbers. Add/subtract/multiply and divide in standard form. Simplify surds.

## Data Handling:

Data collection techniques. Interpret and discuss data. Sort, classify and tabulate data including discrete, continuous, quantitative and qualitative. Averages. Two-way tables. Averages from frequency and grouped frequency tables. Stem and leaf diagram.

Produce and interpret dual bar charts, pie charts, composite bar charts, frequency polygons. Produce histograms with unequal class widths. Estimate a mean/ median from histograms.

Draw scatter graphs. Interpret scatter graphs and identify outliers. Draw lines of best fit and use them to make predictions. Interpolate and extrapolate.

## Shape:

Estimate sizes of an angle. Measure angles using a protractor. Identify perpendicular and parallel lines. Recall properties of quadrilaterals. Angles at a point, straight line, right angle, alternate angles, corresponding angles and vertically opposite angles. Interior and exterior angles in polygons including algebraic problems.

Pythagoras' theorem. Trigonometry (right angled) to find missing angles and sides. Non-calculator trigonometry limited to 0,30,45,60 and 90. Pythagoras' Theorem and Trigonometry in 3D.

## Algebra:

Write an expression. Simplify algebraic expressions. Multiply algebraic expressions. Divide algebraic expressions. Use index laws in algebra. Multiply a single number over a bracket. Simplify expressions involving brackets. Multiply a single number over a bracket. Simplify expressions involving brackets. Factorise algebraic expressions by taking out common factors. Factorise algebraic expressions by taking out common factors. Expand double brackets. Factorise quadratics.

Setup and solve linear equations with brackets and unknowns on both sides. Substitute numbers into a formula. Change the subject of a formula. Kinematics formula.

Recognise sequences including square numbers, cube numbers and Fibonacci sequences. Generate terms in linear sequence and find the  $n$ th term. Generate terms in a quadratic sequence and find the  $n$ th term. Generate terms in a geometric sequence and find the term to term rule.

## Number:

Express a given number as a fraction of another. Simplify fractions and recognise equivalent fractions. Order fractions with different denominators. Convert between mixed numbers and improper fractions. Add, subtract, multiply and divide fractions. Convert between fractions recurring decimals. Find the reciprocal of an integer, decimal or fraction.

Convert between fractions, percentages and decimals. Compare and order fractions, percentages and decimals. Percentage as fraction. Express a given number as a percentage of another. Find percentages without using a calculator. Solve problems with percentages. Work out a percentage increase/ decrease. Use a calculator to find percentages using multipliers. Reverse percentages. Successive percentage questions.

Solve problems dividing into a ratio. Simplify ratios including in the form 1:m. Scale models and currencies using ratio. Convert two separate ratios into one ratio.

## Geometry:

Use Pythagoras' theorem in 2D to find missing sides leaving answers in surd form or rounded decimals. Use trig ratios to solve 2D problems in right angled triangles where angles or sides need to be found. Know exact values for 0,30,45,60 and 90. Pythagoras' theorem and Trigonometry in 3D.

Plot and draw lines in the form  $y =$  ,  $x =$  and  $y = x$  and  $y = -x$ . Recognise and plot lines in the form  $y = mx + c$ . Problems with gradients including parallel and perpendicular gradients.

Recognise linear, quadratic, cubic, reciprocal and circle graphs. Find approximate solutions of quadratic equations from a graph. Plot cubic and reciprocal graphs. Draw circles limited to a centre of (0,0).

