

YEAR 9 HIGHER

ALGEBRA 1

Understand and use the concepts and vocabulary of identities.

know the difference between an equation and identity.

Simplify and manipulate algebraic expressions by expanding products of two binomials and factorising expressions of the form x^2+bx+c .

Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments.

Translate simple situations or procedures into algebraic expressions or formulae

CONSTRUCTIONS

Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/ at a given point, bisecting a given angle)

Use these to construct given figures to solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line.

Construct plans and elevations of 3D shapes.

CALCULATING

Calculate with roots and integers.

Calculate with standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer.

Use inequality notation to specify simple error intervals due to truncation or rounding.

Apply and interpret limits of accuracy.

RATIO AND PROPORTION

Solve problems involving direct and indirect proportion including graphical and algebraic representations.

Apply the concepts of congruence and similarity, including the relationships between lengths in similar figures.

Change freely between compound units (e.g., density, pressure) in numerical and algebraic context.

Use compound units such as density and pressure.

SEQUENCES AND SERIES

Recognise and use Fibonacci type sequences, quadratic sequences.

SOLVING EQUATIONS AND INEQUALITIES 1

Understand and use concepts and vocabulary of inequalities.

Solve linear inequalities in one variable.

Represent the solution set to an inequality on a number line.

CALCULATING SPACE

Identify and apply circle definitions and properties, including: tangent, arc, sector and segment.

Calculate the arc lengths, angles and areas of sectors of circles.

Calculate the surface area of right prisms (including cylinders).

Calculate exactly with multipliers of n

Know the formulae for: Pythagoras' theorem, $a^2+b^2=c^2$, and apply it to find lengths in right-angled triangles in two dimensional figures.

PROOF

Use the basic congruence criteria for triangles (SSS, SAS, ASA RHS).

Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' theorem, triangle properties, and use known results to obtain simple proof.

ALGEBRA 2

Identify and interpret gradients and intercepts of linear functions algebraically.

Use the form $y=mx+c$ to identify parallel lines.

Find the equation of the line through two given points, or through one point with a given gradient.

Interpret the gradient of a straight line as a rate of change.

Recognise, sketch and interpret graphs of quadratic functions.

Recognise, sketch and interpret graphs of simple cubic functions and the reciprocal function $y=1/x$ with $x \neq 0$

Plot and interpret graphs (incl. reciprocal graphs) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration.

SOLVING EQUATIONS AND INEQUALITIES 2

Solve, in simple cases, two linear simultaneous equations algebraically.

Derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution.

Find approximate solutions to simultaneous equations using a graph.

PROBABILITY

Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions.

Enumerate sets and combinations of sets systematically using tree diagrams.

HANDLING DATA

Interpret and construct tables, charts and diagrams, including tables and line graphs for time series data and know their appropriate use.

Draw estimated lines of best fit; make predictions.

Know correlation does not indicate causation; interpolate and extrapolate apparent trends whilst knowing the dangers of doing so.