



Providence English Pvt. School

مدرسة العناية الانجليزية الخاصة

Mathematics

Number

Integers, powers and roots

9Ni.01 Understand the difference between rational and irrational numbers.

9Ni.02 Use positive, negative and zero indices, and the index laws for multiplication and division.

9Ni.03 Understand the standard form for representing large and small numbers.

9Ni.04 Use knowledge of square and cube roots to estimate surds.

Place value, ordering and rounding

9Np.01 Multiply and divide integers and decimals by 10 to the power of any positive or negative number.

9Np.02 Understand that when a number is rounded there are upper and lower limits for the original number.

Fractions, decimals, percentages, ratio and proportion

9Nf.01 Deduce whether fractions will have recurring or terminating decimal equivalents.

9Nf.02 Estimate, add and subtract proper and improper fractions, and mixed numbers, using the order of operations.

9Nf.03 Estimate, multiply and divide fractions, interpret division as a multiplicative inverse, and cancel common factors before multiplying or dividing.

9Nf.04 Use knowledge of the laws of arithmetic, inverse operations, equivalence and order of operations (brackets and indices) to simplify calculations containing decimals and fractions.

9Nf.05 Understand compound percentages.

9Nf.06 Estimate, multiply and divide decimals by integers and decimals.

9Nf.07 Understand the relationship between two quantities when they are in direct or inverse proportion.

9Nf.08 Use knowledge of ratios and equivalence for a range of contexts.

Algebra

Expressions, equations and formulae

9Ae.01 Understand that the laws of arithmetic and order of operations apply to algebraic terms and expressions (four operations and integer powers).

9Ae.02 Understand how to manipulate algebraic expressions including:

- expanding the product of two algebraic expressions
- applying the laws of indices
- simplifying algebraic fractions.

9Ae.03 Understand that a situation can be represented either in words or as an algebraic expression, and move between the two representations (including squares, cubes and roots).

9Ae.04 Understand that a situation can be represented either in words or as a formula (including squares and cubes), and manipulate using knowledge of inverse operations to change the subject of a formula.

9Ae.05 Understand that a situation can be represented either in words or as an equation. Move between the two representations and solve the equation (including those with an unknown in the denominator).

9Ae.06 Understand that the solution of simultaneous linear equations:

- is the pair of values that satisfy both equations
- can be found algebraically (eliminating one variable)
- can be found graphically (point of intersection).

9Ae.07 Understand that a situation can be represented either in words or as an inequality. Move between the two representations and solve linear inequalities.

Sequences, functions and graphs

9As.01 Generate linear and quadratic sequences from numerical patterns and from a given term-to-term rule (any indices).

9As.02 Understand and describe n th term rules algebraically (in the form $an \pm b$, where a and b are positive or negative integers or fractions, and in the form n/a , n^2 , n^3 or $n^2 \pm a$, where a is a whole number).

9As.03 Understand that a function is a relationship where each input has a single output. Generate outputs from a given function and identify inputs from a given output by considering inverse operations (including indices).

9As.04 Understand that a situation can be represented either in words or as a linear function in two variables (of the form $y = mx + c$ or $ax + by = c$), and move between the two representations.

9As.05 Use knowledge of coordinate pairs to construct tables of values and plot the graphs of linear functions, including where y is given implicitly in terms of x ($ax + by = c$), and quadratic functions of the form $y = x^2 \pm a$.

9As.06 Understand that straight-line graphs can be represented by equations. Find the equation in the form $y = mx + c$ or where y is given implicitly in terms of x (fractional, positive and negative gradients).

9As.07 Read, draw and interpret graphs and use compound measures to compare graphs.

Geometry and Measure

Geometrical reasoning, shapes and measurements

9Gg.01 Know and use the formulae for the area and circumference of a circle.

9Gg.02 Know and recognise very small or very large units of length, capacity and mass.

9Gg.03 Estimate and calculate areas of compound 2D shapes made from rectangles, triangles and circles.

9Gg.04 Use knowledge of area and volume to derive the formula for the volume of prisms and cylinders. Use the formula to calculate the volume of prisms and cylinders.

9Gg.05 Use knowledge of area, and properties of cubes, cuboids, triangular prisms, pyramids and cylinders to calculate their surface area.

9Gg.06 Identify reflective symmetry in 3D shapes.

9Gg.07 Derive and use the formula for the sum of the interior angles of any polygon.

9Gg.08 Know that the sum of the exterior angles of any polygon is 360° .

9Gg.09 Use properties of angles, parallel and intersecting lines, triangles and quadrilaterals to calculate missing angles.

9Gg.10 Know and use Pythagoras' theorem.

9Gg.11 Construct 60° , 45° and 30° angles and regular polygons.

Position and transformations

9Gp.01 Use knowledge of bearings and scaling to interpret position on maps and plans.

9Gp.02 Use knowledge of coordinates to find points on a line segment.

9Gp.03 Transform points and 2D shapes by combinations of reflections, translations and rotations.

9Gp.04 Identify and describe a transformation (reflections, translations, rotations and combinations of these) given an object and its image.

9Gp.05 Recognise and explain that after any combination of reflections, translations and rotations the image is congruent to the object.

9Gp.06 Enlarge 2D shapes, from a centre of enlargement (outside, on or inside the shape) with a positive integer scale factor. Identify an enlargement, centre of enlargement and scale factor.

9Gp.07 Analyse and describe changes in perimeter and area of squares and rectangles when side lengths are enlarged by a positive integer scale factor.

Statistics and Probability

Statistics

9Ss.01 Select, trial and justify data collection and sampling methods to investigate predictions for a set of related statistical questions, considering what data to collect, and the appropriateness of each type (qualitative or quantitative; categorical, discrete or continuous).

9Ss.02 Explain potential issues and sources of bias with data collection and sampling methods, identifying further questions to ask.

9Ss.03 Record, organise and represent categorical, discrete and continuous data. Choose and explain which representation to use in a given situation:

- Venn and Carroll diagrams
- tally charts, frequency tables and two-way tables
- dual and compound bar charts
- pie charts
- line graphs, time series graphs and frequency polygons
- scatter graphs
- stem-and-leaf and back-to-back stem-and-leaf diagrams
- infographics.

9Ss.04 Use mode, median, mean and range to compare two distributions, including grouped data.

9Ss.05 Interpret data, identifying patterns, trends and relationships, within and between data sets, to answer statistical questions. Make informal inferences and generalisations, identifying wrong or misleading information.

Probability

9Sp.01 Understand that the probability of multiple mutually exclusive events can be found by summation and all mutually exclusive events have a total probability of 1.

9Sp.02 Identify when successive and combined events are independent and when they are not.

9Sp.03 Understand how to find the theoretical probabilities of combined events.

9Sp.04 Design and conduct chance experiments or simulations, using small and large numbers of trials. Calculate the expected frequency of occurrences and compare with observed outcomes.