

Cambridge PreAICE Math 9

- PS 1 Use letters to express generalized numbers and express basic arithmetic processes algebraically. Substitute numbers for words and letters in formulae. Transform simple formulae.
- PS 2 Identify and use natural numbers, integers, rational and irrational numbers. Use language, notation and Venn Diagrams to describe sets and represent relationships between sets.
- PS 3 Give appropriate Upper and Lower bounds for data given to a specified accuracy.
- PS 4 Demonstrate an understanding of the elementary ideas and notation of ratio. Set up and apply direct and inverse proportions.
- PS 5 Calculate a given percentage of a quantity. Calculate percentage increase or decrease.
- PS 6 Solve simple linear equations in one unknown. Solve simultaneous linear equations in two unknowns.
- PS 7 Solve quadratic equations by factorization. Solve quadratic equations by completing the square or by use of the quadratic formula.
- PS 8 Represent inequalities graphically.
- PS 9 Manipulate directed numbers, use brackets and extract common factors. Multiply rational polynomials including use of the binomial theorem.
- PS 10 Expand products of algebraic expressions. Factorize and simplify expressions.
- PS 11 Interpret and obtain the equation of a straight line graph in the form $y=mx+c$. Determine the equation of a straight line parallel to a given line.
- PS 12 Calculate the gradient of a straight line from the co-ordinates of two points on it. Calculate the length and midpoint of a straight line segment from the co-ordinates of its end points.
- PS 13 Measure lines and angles. Construct a triangle given the three sides using a ruler and pair of compasses only. Construct other simple geometrical figures from given data using protractors and set squares as necessary.
- PS 14 Construct angle bisectors and perpendicular bisectors using straight edges and pair of compasses only. Use the following loci and method of intersecting loci for sets of points in two dimensions: from a given distance from a point or line as well as points which are equidistant from two points or lines.
- PS 15 Know, prove and apply basic theorems about similar figures, including scale factors of area and volume. Use the relationships between areas of similar triangles, with corresponding results for similar figures and extension to volumes and surface areas of similar solids.
- PS 16 Calculate unknown angles at a point, between intersecting lines, formed within parallel lines and angles in semi circle or full circle.
- PS 17 Calculate unknown angles using properties of regular and irregular polygons.
- PS 18 Carry out calculations involving the perimeter and area of a rectangle and triangle. Carry out calculations involving the circumference and area of a circle. Carry out calculations involving the area of parallelograms and trapeziums.
- PS 19 Solve problems involving the arc length and sector area as fractions of the circumference and area of a circle. Solve problems involving the surface area and volume of a sphere, pyramid and cone.
- PS 20 Describe a translation by using a vector represented by e.g. $\begin{pmatrix} x \\ y \end{pmatrix}$, \vec{AB} , or \mathbf{a} . Add and subtract vectors and multiply a vector by a scalar. Calculate the magnitude of a vector.
- PS 21 Represent vectors by directed line segments; use the sum and difference of two vectors to express given vectors in terms of two coplanar vectors. Find and use position vectors.
- PS 22 Identify the order of a matrix and display information in the form of a matrix of any order. Calculate the sum, difference and product (where appropriate) of two matrices and calculate the product of a matrix and a scalar quantity.

- PS 23 Calculate the determinant and inverse \mathbf{A}^{-1} of a non-singular 2×2 matrix \mathbf{A} . Transform an image given a transformation matrix. Determine the matrix that will transform a given object into a given image.
- PS 24 Recognize rotational and line symmetry (including order of rotational symmetry) in two dimensions and properties of triangles, quadrilaterals and circles directly related to their symmetries. Recognize symmetry properties of the prism (including cylinder) and the pyramid (including cone). Recognize that equal chords in a circle are equidistant from the center and solve problems involving equal chords.
- PS 25 Recognize that the perpendicular bisector of a chord passes through the center of a circle and solve problems involving the perpendicular bisectors of chords in a circle. Recognize that tangents from an external point of a circle are equal in length and solve problems involving tangents to a circle.