IB Standards of Mathematics Required

TOPIC	CONTENT
Set Language and Notation	Use set language and notation, and Venn diagrams to describe sets and to represent the relationship between them. Recognize and use the following notations: $A \cup B, A \cap B$, $n(A), \in, \notin, A', \varnothing, \subset, \subseteq$ Apply the above notations and combinations of them in the solution of challenging problems.
Estimation and Limits of Accuracy and Standard Form	Make estimates of numbers, quantities and lengths. Give approximations to special numbers of significant figures and decimal places. Find upper and lower bounds for data given to a specified accuracy.
Sequences	Complete a given sequence. Find the nth term of sequences. Apply sequences to real-world situations. Use the standard form $A \times 10^n$ where n is a positive or negative integer, and $1 \leq A < 10$
Mensuration	Calculate the perimeter and area of a rectangle and triangle, the circumference and area of a circle, the area of a parallelogram and trapezium. Calculate the volumes of cuboids, prisms and cylinders. Calculate the surface area of a cuboid and a cylinder. Find arc length and sector area as fractions of the circumference and area of a circle.
Geometrical terms and relationships	Use and interpret the geometrical terms; point, line, parallel, bearing, right angle, acute, obtuse and reflex angles, perpendicular, similarity, congruence. Use the relationship between areas of similar triangles, with corresponding results for similar figures.
Symmetry	Identify rotational and line symmetry in two dimensions and the properties of triangles, quadrilaterals and circles directly related to their symmetries. Identify the symmetry properties of the prism and the pyramid.

Angle properties	Calculate unknown angles using the following geometric properties: a) angles at a point b) angles on a straight line and intersecting straight lines c) angles formed within parallel lines. (d) angle properties of triangles and quadrilaterals. Discover and then calculate unknown angles using the angle properties of regular and irregular polygons. Discover and then calculate unknown angles using the geometrical properties-angle in a semi-circle, angle at the centre of a circle is twice the angle at the circumference, angles in the same segment are equal. Angles in opposite segments are supplementary, angle between the tangent and radius of a circle is a right angle.
Algebraic manipulation	Expand the products of algebraic expressions. Factorize expressions of the form: $ax+bx+kay+kby, a^2x^2-b^2y^2, a^2+2ab+b^2,$ ax^2+bx+c. Manipulate algebraic fractions. Factorize and simplify algebraic expressions. Solve two linear equations simultaneously. Use the laws of indices in the solution of problems.
The straight line	Find the equation of a straight line in the form $y=mx+c$, the equation of a straight line parallel to a given line, the gradient of a straight line from two points on it, the length of a straight line and the coordinates of a mid-point from its end points. Transform complicated formulae and equations.

Functions	Express functions in appropriate notation; find inverse functions and composite functions (simple cases only).
Graphs of functions	Construct table of values for functions of the form $f(x) = ax + b$, $f(x) = x^2 + ax + b$, $f(x) = \frac{a}{x} (x \neq 0)$ where a and b are integral constants. Use table of values to draw graphs. Draw and interpret such graphs. Solve linear and quadratic equations simultaneously by graphical methods. Graph functions of the form $f(x) = ax^n$ where a is a rational constant and $n =$ -2, -1, 0, 1, 2, 3 and simple sums of not more than three of these and for functions of the form a^x where a is a positive integer. Estimate gradients of curves by drawing tangents. Find solutions of associated equations approximately by graphical methods.
Trigonometry	Interpret and use 3-figure bearings measured clockwise from the north. Solve trigonometric problems including angles of elevation and depression using the Pythagoras' theorem, sine and cosine rules. Solve simple trigonometric problems in 3-dimension including angle between a line and a plane.
Vectors	Add and subtract vectors. Multiply a vector by a scalar. Find the magnitude of a vector. Represent vectors by directed line segments. Use the sum and differences of two vectors to express given vectors in terms of two coplanar vectors. Use position vectors in the solution of simple problems.
Probability	Calculate the probability of a single event. Calculate the probability of simple combined events, independent events and conditional probability using possibility/tree diagrams where appropriate.
Inequalities and linear programming	Represent inequalities graphically and use this representation in the solution of simple linear programming problems (the conventions of using broken lines for strict inequalities and shading unwanted regions expected).

Geometrical Constructions	Measure lines and angles. Construct a triangle given 3 sides using compasses and ruler only. Construct other simple geometric figures from data using set squares, protractors, rulers etc. Construct angle bisectors and perpendicular bisectors using straight edge and compasses only.
Statistics	Collect, classify and tabulate statistical data. Interpret and draw simple inferences from tables and diagrams. Construct and use bar charts, pie charts, pictograms and simple frequency distributions. Construct and read histograms with equal and un equal intervals. Construct and use scatter diagrams. Distinguish between positive, negative and zero correlation. Calculate the mean, median and mode for discrete data. Estimate the mean for continuous data. Identify the modal class of a grouped frequency tables. Construct and use cumulative frequency diagrams. Use diagrams to estimate and interpret the median, percentiles, quartiles, inter- quartile range and range.
Transformations	Rotate simple plane figures about the origin, vertices or mid-points of edges of figures, through multiples of 90^0. Construct given translations and enlargements of simple plane figures. Construct and use shear and stretching. Use the combinations of all the transformations. Identify and give precise descriptions of transformations connecting given figures. Describe transformations using coordinates and matrices.
Matrices	Display information in the form of a matrix of any order. Find the sum and product of two matrices (where appropriate). Find the product of a matrix and a scalar quantity. Explore the algebra of 2×2 matrices including zero and identity matrices. Find the determinant and inverse A^{-1} of a non-singular matrix A

Examination Criteria - IB Entrance Examination

Structured Questions (demanding elaborate solutions)
Candidate should answer all questions
Weighting: 100%