

## MATHEMATICS ENTRANCE EXAMINATION SYLLABUS

TOPIC	CONTENT
<b>Numbers</b>	<p>Routine use of addition, subtraction, multiplication and division, using integers, decimals and fractions, including order in operations.</p> <p>Integer exponents. Laws of exponents. Square and cubic roots.</p> <p>Expression of numbers in standard form (scientific notation).</p> <p>Simplification of expressions involving roots, including rationalizing the denominator.</p> <p>Divisibility rules for 2, 5, 10, 3 and 9. Prime numbers. Composite numbers, factors, including greatest common factors and least common multiples.</p> <p>Definition of absolute value (modulus).</p> <p>Applications of ratio, percentage and proportion, linked to similarity. Compound interest.</p> <p>Rounding decimal approximations.</p>
<b>Sets and numbers</b>	<p>Number systems: natural numbers, integers, rational and irrational numbers, real numbers.</p> <p>Intervals on the real number line using inequalities.</p>
<b>Algebra</b>	<p>Basic manipulation of simple algebraic expressions involving factorization, expansion and completing the square. Formulae:  <math>a^2 - b^2 = (a + b)(a - b)</math>; <math>(a \pm b)^2 = a^2 \pm 2ab + b^2</math>.</p> <p>Rearrangement, evaluation and combination of simple formulae, simplifying.</p> <p>Addition, subtraction, multiplication, division and simplifying algebraic fractions.</p> <p>Solutions of linear, quadratic, rational equations and inequalities in one variable.</p> <p>Discriminant.</p> <p>Linear and quadratic equations with parameters.</p> <p>Solution of simultaneous equations in two variables with linear equations or with one quadratic equation.</p> <p>Solution of system of linear inequalities.</p>
<b>Cartesian plane and functions</b>	<p>Distance between two points in the Cartesian plane. Coordinates of midpoint of a line segment.</p> <p>The linear function and its graph, gradient and y-intercept.</p> <p>The quadratic function, its graph, coordinates of vertex, properties. Maximum and/or minimum values of quadratic function in the given interval.</p> <p>Domain and range of linear and quadratic functions.</p>
<b>Geometry</b>	<p>Triangle. Properties of equilateral and isosceles triangles. Pythagoras' theorem and its converse. Equal and similar triangles. Similar plane figures. Ratio of their perimeters and areas.</p> <p>Quadrilaterals: parallelograms, rhombuses, rectangles, squares and trapeziums; compound shapes. Their properties, perimeters and areas.</p> <p>Properties of midline of triangle and of trapezium.</p> <p>The circle, its centre and radius, area and circumference. Length of arc, area of sector. Chord, tangent and segment, properties of the tangent.</p> <p>Parallel and perpendicular straight lines, angle between straight lines in three dimensional shapes.</p> <p>Cube, rectangular, prism. Their surface area and volume.</p> <p>Regular pyramid. Its surface area and volume.</p> <p>Volume and surface area of revolutions: cone and cylinder.</p>

<b>Trigonometry</b>	Right-angle trigonometry. Pythagorean identity. Solution of right triangles.
<b>Probability and statistics</b>	Counting principles, additional and multiplication rules. Probability of event. Descriptive statistics: collection of raw data, display of data in pictorial and diagrammatic forms, frequency table. Obtaining simple statistics from discrete data, including mean, median and mode.