Prior learning topics

As noted in the previous section on prior learning, it is expected that all students have extensive previous mathematical experiences, but these will vary. It is expected that mathematics SL students will be familiar with the following topics before they take the examinations, because questions assume knowledge of them. Teachers must therefore ensure that any topics listed here that are unknown to their students at the start of the course are included at an early stage. They should also take into account the existing mathematical knowledge of their students to design an appropriate course of study for mathematics SL. This table lists the knowledge, together with the syllabus content, that is essential to successful completion of the mathematics SL course.

Students must be familiar with SI (*Système International*) units of length, mass and time, and their derived units.

Topic	Content
Number	Routine use of addition, subtraction, multiplication and division, using integers, decimals and fractions, including order of operations.
	Simple positive exponents.
	Simplification of expressions involving roots (surds or radicals).
	Prime numbers and factors, including greatest common divisors and least common multiples.
	Simple applications of ratio, percentage and proportion, linked to similarity.
	Definition and elementary treatment of absolute value (modulus), $\lvert a \rvert$.
	Rounding, decimal approximations and significant figures, including appreciation of errors.
	Expression of numbers in standard form (scientific notation), that is, $a \times 10^{k}$, $1 \le a < 10$, $k \in \mathbb{Z}$.
Sets and numbers	Concept and notation of sets, elements, universal (reference) set, empty (null) set, complement, subset, equality of sets, disjoint sets.
	Operations on sets: union and intersection.
	Commutative, associative and distributive properties.
	Venn diagrams.
	Number systems: natural numbers; integers, $\mathbb{Z}$; rationals, $\mathbb{Q}$, and irrationals; real numbers, $\mathbb{R}$.
	Intervals on the real number line using set notation and using inequalities. Expressing the solution set of a linear inequality on the number line and in set notation.
	Mappings of the elements of one set to another. Illustration by means of sets of ordered pairs, tables, diagrams and graphs.
Algebra	Manipulation of simple algebraic expressions involving factorization and expansion, including quadratic expressions.
	Rearrangement, evaluation and combination of simple formulae. Examples from other subject areas, particularly the sciences, should be included.
	The linear function and its graph, gradient and *y*-intercept.
	Addition and subtraction of algebraic fractions.
	The properties of order relations: $<, \le, >, \ge$.
	Solution of equations and inequalities in one variable, including cases with rational coefficients.
	Solution of simultaneous equations in two variables.

Topic	Content
Trigonometry	Angle measurement in degrees. Compass directions and three figure bearings.
	Right-angle trigonometry. Simple applications for solving triangles.
	Pythagoras' theorem and its converse.
Geometry	Simple geometric transformations: translation, reflection, rotation, enlargement. Congruence and similarity, including the concept of scale factor of an enlargement.
	The circle, its centre and radius, area and circumference. The terms "arc", "sector", "chord", "tangent" and "segment".
	Perimeter and area of plane figures. Properties of triangles and quadrilaterals, including parallelograms, rhombuses, rectangles, squares, kites and trapeziums (trapezoids); compound shapes.
	Volumes of prisms, pyramids, spheres, cylinders and cones.
Coordinate geometry	Elementary geometry of the plane, including the concepts of dimension for point, line, plane and space. The equation of a line in the form $y = mx + c$.
	Parallel and perpendicular lines, including $m_1 = m_2$ and $m_1 m_2 = -1$.
	Geometry of simple plane figures.
	The Cartesian plane: ordered pairs (x, y), origin, axes.
	Mid-point of a line segment and distance between two points in the Cartesian plane and in three dimensions.
Statistics and probability	Descriptive statistics: collection of raw data; display of data in pictorial and diagrammatic forms, including pie charts, pictograms, stem and leaf diagrams, bar graphs and line graphs.
	Obtaining simple statistics from discrete and continuous data, including mean, median, mode, quartiles, range, interquartile range.
	Calculating probabilities of simple events.