Mathematics 2018 – 2019

Scheme of Work / Term wise syllabus breakup

Class 10

KEY: Text in red indicates new assessment objectives added as per CIE syllabus 2018-2020
Sub-objectives have been highlighted in blue

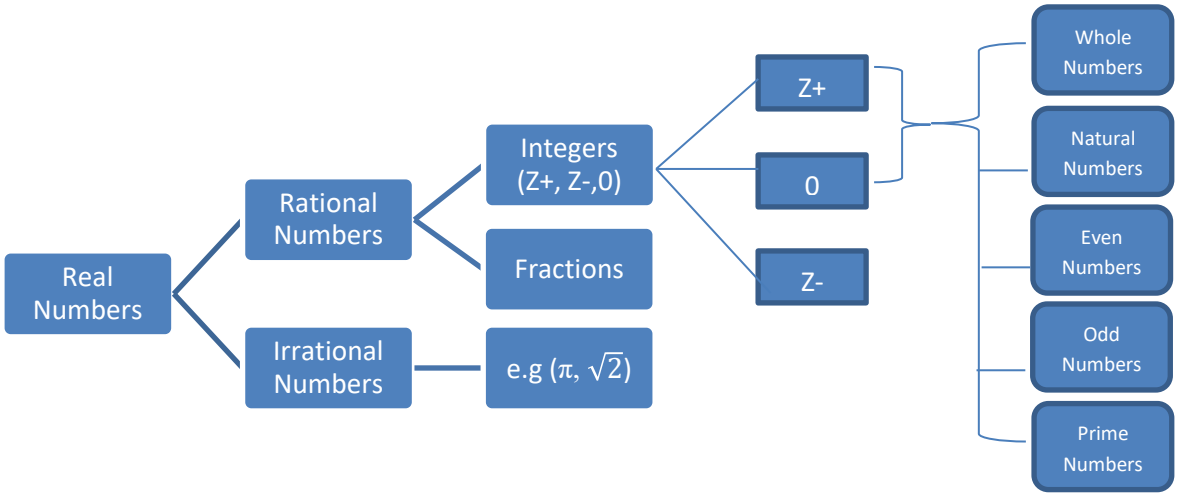
Number Theory and Arithmetic | Algebra and Functions | Geometry and Measures | Probability and Statistics — Strands defined in the document

Use of an electronic calculator:

All candidates should have a silent electronic calculator. A scientific calculator with trigonometric functions is strongly recommended for P2

- use a calculator efficiently
- apply appropriate checks of accuracy
- enter a range of measures including time
  e.g. enter 2 hours 30 minutes as 2.5 hours
- interpret the calculator display appropriately
  e.g. in money 4.8 means $ 4.80; in time 3.25 means 3 hours 15 minutes

Real Number Flow Chart



Numbers:

Identify and **use** natural numbers, integers (positive, negative and zero) prime numbers, square numbers, cube numbers, common factors and common multiples, rational and irrational numbers, real numbers.

Term 1				
Strand	**Unit**	**Topic**	**Objectives**	**Time**
Number Theory and Arithmetic	Sets	Notation: • Number of elements in set A $n(A)$ • "… is an element of …" $\in$ • "… is not an element of …" $\notin$ • Complement of set A A' • The empty set $\emptyset$ • Universal set ε • A is a subset of B $A \subseteq B$ • A is a proper subset of B $A \subset B$ • A is not a subset of B $A \nsubseteq B$ • A is not a proper subset of B $A \not\subset B$ • Union of A and B $A \cup B$ • Intersection of A and B $A \cap B$ Applications of sets Venn diagrams	• use language, notation and Venn diagrams to describe sets • define and identify an empty set, a universal set, equal sets, disjoint sets and complement of a set and to give Examples of the sets • define and distinguish subsets and proper subsets of a given set • define the intersection and union of sets and the relationships between sets by using Venn diagrams • use Venn diagrams to solve problems • represent relationships between sets • definition of sets: e.g. $A = \{x : x \text{ is a natural number}\}$ $B = \{(x, y): y = mx + c\}$ $C = \{x : a \leq x \leq b\}$ $D = \{a, b, c…\}$	**2 weeks**
Algebra and Function	Graphical representation of inequalities		• solve linear inequalities in one or two variables • represent linear inequalities in one or two variables graphically • find the maximum/highest and minimum/least values of a function satisfying certain given linear inequalities	**2 weeks**
	Graphs of functions	• linear functions • quadratic functions • cubic functions • reciprocal functions • exponential functions	• construct tables of values and draw graphs for functions of the form $\boldsymbol{y = ax^n}$ where $\boldsymbol{a}$ 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 $\boldsymbol{ka^x}$ where $\boldsymbol{a}$ is a positive integer • draw graphs for given functions and use them to solve	**2 weeks**

			related equations graphically • interpret the graphs of the given functions • use graphs to estimate the unknown value(s) of x for a given value of y and vice versa • solve associated equations approximately by graphical methods • estimate gradients of curves by drawing tangents • sketch graphs of quadratic functions	
Algebra and Function	Function notation	• Function notation • Inverse functions	• use function notation e.g. $f(x) = 3x - 5; f: \rightarrow 3x - 5$ to describe simple functions • find inverse functions $f^{-1}(x)$	**2 weeks**
	Graphs applied to Kinematics	• distance-time graphs • speed time-graphs • gradients of distance-time and speed-time curves • acceleration • deceleration/retardation/ negative acceleration	• interpret and use graphs in practical situations including travel graphs and conversion graphs • draw graphs from the given data • apply the idea of rate of change to easy kinematics involving distance-time and speed-time graphs, acceleration and deceleration • Calculate distance travelled as area under a linear speed-time graph. • use tangents to calculate the speed and acceleration from the non-linear distance-time and speed-time graphs • interpret the distance-time graphs and speed-time graphs •	**3 weeks**
Geometry and Measures	Trigonometry	• sine rule • cosine rule • bearings • 3D problems • area of a triangle	• extend sine and cosine functions to angles between 90° and 180° • solve problems using the sine and cosine rules for any triangle and the formula area of a triangle = ½ *ab* sin *C* [*angles will be quoted in, and answers required in, degrees and decimals of a degree to one decimal place*] • interpret and use three figure bearings	**3 weeks**

			• measure clockwise from the north, i.e 000° - 360° *e.g. Find the bearing of A from B if the bearing of B from A is 125°* • solve simple trigonometric problems in three dimensions (calculations of the angle between two planes or of the angle between a straight line and plane **will not be required**)	
Total number of weeks				**14 weeks**

Term 2				
Strand	**Unit**	**Topic**	**Objectives**	**Time**
Number Theory and Arithmetic	Limits of accuracy	• Upper Bounds • Lower Bounds • Use upper and lower bound for simple problems	• give appropriate upper and lower bounds for data given to a specified accuracy *[e.g. measured lengths]* • Obtain appropriate upper and lower bounds to solutions of simple problems given data to a specified accuracy *[e.g. the calculation of the perimeter or area of a rectangle]*	**2 weeks**
Probability and Statistics	Statistical diagram	• Frequency Curve • Cumulative frequency diagrams	• construct and use cumulative diagrams • estimate and interpret the median, percentiles, quartiles and interquartile range for cumulative frequency diagrams • calculate with frequency density	**2 weeks**
Numbers Theory and Arithmetic	Matrices	• kind of matrices • addition and subtraction of matrices • multiplication of matrices with a real number (scalar multiplication) • multiplication of matrices • inverse matrix • application of inverse matrices	• display information in the form of a matrix of any order • solve problems involving the calculation of the sum and product (where appropriate) of two matrices and interpret the results • calculate the product of a matrix and a scalar quantity • use the algebra of 2 × 2 matrices including the zero and identity 2 × 2 matrices • calculate the determinant **l A l** and inverse $\boldsymbol{A^{-1}}$of a non-singular matrix **A**	**3 weeks**
Geometry and Measurements	• Symmetry • Angles *(Geometrical*	• symmetry properties of the prism the pyramid • symmetrical properties of circles	• recognise symmetry properties of the prism (including cylinder) and the pyramid (including cone) • use the following **symmetry properties of circles**: a) equal chords are equidistant from the centre	**3 weeks**

	Properties of Circles)	• angle properties of circles	b) the perpendicular bisector of a chord passes through the centre c) tangents from an external point are equal in length • **angle properties of circles** a) angle in a semicircle b) angle between tangent and radius of a circle c) angle at the centre of a circle is twice the angle at the circumference d) angles in the same segment are equal e) angles in opposite segments are supplementary	
	Geometrical constructions	Scale drawings	• Read and make scale drawings	**1 week**
Revision	Following objectives should be focused during revision week: **Mensuration** • interpret and solve word problems involving volume and surface area of compound shapes • use and interpret nets *[e.g. the net of a prism]* **Compound interest** Knowledge of compound interest formula given below is required: Value of investment = $P = \left[1 + \frac{r}{100}\right]^n$ *Where P is the amount invested, r is the percentage rate of interest and n is the number of years of compound interest.* **Coordinate geometry** • determine the equation of a straight line parallel to a given line *e.g. find the equation of a line parallel to y = 4x – 1 that passes through (0, –3)* • find the gradient of parallel and perpendicular lines *e.g. find the gradient of a line perpendicular to y = 3x + 1* *e.g. find the equation of a line perpendicular to one passing through the coordinates (1, 3) and (–2, –9)* **Statistics** • distinguish between the purposes for which mean, median, mode and range of the given data are used (both for individual and discrete data) • construct and interpret scatter diagrams			**3 weeks**

	• understand what is meant by positive, negative and zero correlation with reference to a scatter diagram draw a straight line of best fit by eye **Polygons** difference between regular and irregular polygons **Note for the teachers:** ✓ Prepare worksheets based on the above mentioned topics beforehand to have an effective implementation of the taught concepts. ✓ Give **clear, correct and concise** explanation to these topics. ✓ After teaching multiple concepts from the list above provide students with the worksheet to assess their learning.	
Total number of weeks		**14 weeks**