

# Mathematics 2018 – 2019

## Scheme of Work / Term wise syllabus breakup

### Class 9

**KEY:** Text in red indicates new assessment objectives added as per CIE syllabus 2018-2020

Sub-objectives have been highlighted in blue

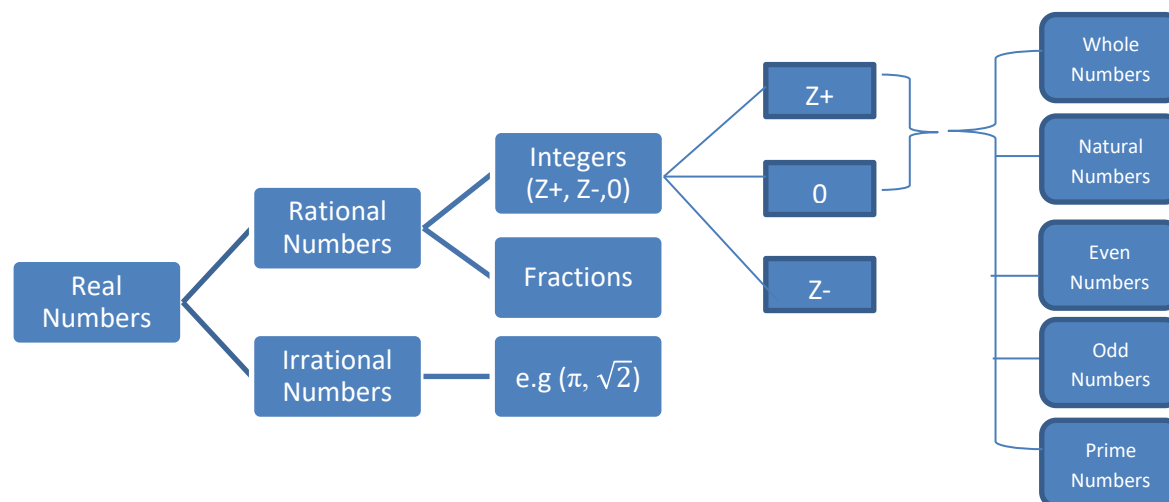


### Use of an electronic calculator:

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**

<b>Strand</b>	<b>Unit</b>	<b>Topic</b>	<b>Objectives</b>	<b>Time</b>
<b>Algebra and Functions</b>	Variations	<ul style="list-style-type: none"> <li>• Direct Variation</li> <li>• Inverse Variation</li> </ul>	<ul style="list-style-type: none"> <li>• express direct and inverse variation in algebraic terms</li> <li>• use this form of expression to find the unknown quantities <i>[Includes linear, square, square root and cubic variation (direct and inverse).e.g. y is inversely proportional to the square of x. Given that y = 2 when x = 6, find the value of y when x = 2 ]</i></li> </ul>	<b>1 week</b>
<b>Algebra and Functions</b>	<ul style="list-style-type: none"> <li>• Algebraic representation and formulae</li> <li>• Algebraic manipulation</li> </ul>		<ul style="list-style-type: none"> <li>• factorise and simplify rational expressions</li> <li>• construct and transform formulae and equations <i>e.g. transform formulae where the subject appears twice or where a power of the subject appears</i> <i>e.g. construct equations from numerical and geometrical problems</i></li> <li>• find the value of an unknown quantity in a formula</li> <li>• factorise and simplify rational expressions</li> <li>• simplify fractional indices</li> <li>• understand and use the rules of indices</li> <li>• manipulate algebraic fractions</li> </ul>	<b>2 weeks</b>
	• Indices	<ul style="list-style-type: none"> <li>• Rules of Indices</li> <li>• Different types of indices</li> </ul>	<ul style="list-style-type: none"> <li>• Understand and use the rules of indices e.g. <i>work out <math>2^{-3} \times 2^4</math></i> <i>simplify <math>3x^{-4} \times \frac{2}{3}x^{\frac{1}{2}}, \frac{2}{5}x^{\frac{1}{2}} \div 2x^{-2}</math> and <math>\left(\frac{2x^5}{3}\right)^3</math></i></li> <li>• Use and interpret positive, negatives, fractional and zero indices e.g. <math>5^{\frac{1}{2}} = \sqrt{5}</math> <i>evaluate <math>2^5, 4^0, 5^{-2}, 100^{\frac{1}{2}}, 8^{\frac{-2}{3}}</math></i></li> </ul>	<b>1 week</b>



			base <ul style="list-style-type: none"> <li>calculate the volume and surface area of a composite solids</li> <li><b>interpret and solve word problems involving volume and surface area of compound shapes</b></li> <li><b>use and interpret nets [e.g. net of a prism]</b></li> </ul>	
Total number of weeks				14 weeks

**Term 2**

<b>Strand</b>	<b>Unit</b>	<b>Topic</b>	<b>Objectives</b>	<b>Time</b>
<b>Number Theory and Arithmetic</b>	Personal and small business finance	<ul style="list-style-type: none"> <li><b>Percentages</b></li> <li>Discount</li> <li>Profit and loss</li> <li>Taxation</li> <li>Personal and Household finance</li> <li>Simple interest</li> <li>Compound interest</li> <li>Hire purchase</li> <li>Commission</li> <li>Money</li> </ul>	<ul style="list-style-type: none"> <li>solve problems involving <b>percentages</b>. Includes discount, and profit and loss (as an amount or a percentage).</li> </ul> <p><b>Percentages:</b></p> <ul style="list-style-type: none"> <li>Calculate the given percentage of a quantity</li> <li>Express one quantity as a percentage of another</li> <li>Calculate percentage increase or decrease</li> <li>Carry out calculations involving reverse percentages</li> </ul> <ul style="list-style-type: none"> <li>solve problems involving taxation</li> <li>use given data to solve problems on personal and small business finance involving earnings, simple interest and compound interest.</li> </ul> <p>Knowledge of compound interest formula given below is required:</p> <p><b>Value of investment = <math>P = \left[1 + \frac{r}{100}\right]^n</math></b></p> <p>Where <i>P</i> is the amount invested, <i>r</i> is the percentage rate of interest and <i>n</i> is the number of years of compound interest.</p> <ul style="list-style-type: none"> <li>extract data from tables and charts</li> <li>solve problems involving hire purchase</li> <li>use different problem solving strategies to solve everyday life problems</li> <li>solve problems involving money and convert one currency to another</li> </ul>	<b>2 weeks</b>
<b>Algebra and Functions</b>	Solutions of equations and inequalities	Solution to quadratic equations <ul style="list-style-type: none"> <li>Factorisation</li> <li>Completing the square</li> <li>Using the quadratic formula</li> <li>Problems involving quadratic equations</li> </ul>	<ul style="list-style-type: none"> <li>solve quadratic equations using               <ul style="list-style-type: none"> <li>factorisation method</li> <li>completing square method</li> <li>the quadratic formula</li> </ul> </li> <li>interpret and solve word problems that can be reduced to quadratic equations</li> </ul>	<b>2 weeks</b>

		Linear inequalities in one variable	<ul style="list-style-type: none"> <li>solve simple linear inequalities in one variable</li> <li>represent the answers using number line</li> </ul>	<b>2 weeks</b>
<b>Algebra and Functions</b>	Coordinate geometry	<ul style="list-style-type: none"> <li>Length of segment</li> <li>Mid-point</li> <li>Gradient of a straight line</li> <li>Equation of a straight line</li> <li>Equation of parallel lines</li> <li>Gradient of parallel and perpendicular lines</li> </ul>	<ul style="list-style-type: none"> <li>demonstrate familiarity with Cartesian coordinates in two dimensions</li> <li>find the gradient of a straight line</li> <li>calculate the gradient of a straight line from the coordinates of two points on it</li> <li>calculate the <b>length</b> and the coordinates of the <b>midpoint</b> of a line segment from the coordinates of its end points</li> <li>Interpret and obtain the equation of a straight line graph in the form <math>y = mx + c</math></li> <li><b>determine the equation of a straight line parallel to a given line</b> e.g. find the equation of a line parallel to <math>y = 4x - 1</math> that passes through <math>(0, -3)</math></li> <li><b>find the gradient of parallel and perpendicular lines</b> e.g. find the gradient of a line perpendicular to <math>y = 3x + 1</math> e.g. find the equation of a line perpendicular to one passing through the coordinates <math>(1, 3)</math> and <math>(-2, -9)</math></li> </ul>	<b>2 weeks</b>
<b>Geometry and Measurements</b>	Symmetry	Plane and rotational Symmetry, planes of symmetry, axes of rotational symmetry, order of rotational symmetry	<ul style="list-style-type: none"> <li>draw/state the number of <b>lines/planes of symmetry</b></li> <li>draw/state the number of axes of <b>rotational symmetry</b></li> <li>recognize rotational and line symmetry (including order of rotational symmetry) in two dimensions. Includes properties of triangles, quadrilaterals and circles directly related to their symmetries.</li> </ul>	<b>1 week</b>
	Similarity and Congruence	<ul style="list-style-type: none"> <li>Congruent and similar triangles</li> <li>Similarity tests</li> <li>Area and volume of similar figures and solids</li> </ul>	<ul style="list-style-type: none"> <li>solve problems and give simple explanations involving similarity and congruence [ Includes showing that two triangles are similar or showing that two triangles are congruent (using correct congruence condition SSS, SAS, ASA, RHS) ]</li> <li>calculate lengths of similar figures</li> <li>use the relationships between areas of similar triangles,</li> </ul>	<b>3 weeks</b>

			with corresponding results for similar figures, and extension to volumes and surface areas of similar solids. ( Includes use of scale factor )	1 week
	Geometrical constructions	Scale drawings	<ul style="list-style-type: none"> <li>Read and make scale drawings</li> </ul>	
Probability and Statistics	Statistics	<ul style="list-style-type: none"> <li>Categorical</li> <li>Numerical and</li> <li>Grouped data</li> </ul>	<ul style="list-style-type: none"> <li>collect, classify and tabulate statistical data</li> <li>read, interpret and draw simple inferences from tables and statistical diagrams</li> <li>calculate the mean, median, mode and range for individual and discrete data and distinguish between the purposes for which they are used</li> <li>calculate an estimate of the mean for grouped and continuous data</li> <li>identify the modal class from a grouped frequency distribution</li> </ul>	1 week
	Statistical diagrams	<ul style="list-style-type: none"> <li>Frequency Polygon</li> <li>histograms with equal and unequal intervals</li> <li><b>scatter diagrams</b></li> </ul>	<ul style="list-style-type: none"> <li>construct and <b>interpret bar charts, pie charts, pictograms</b>, simple frequency distributions, <b>frequency polygons, histograms</b> with equal and unequal intervals and scatter diagrams</li> <li><i>For unequal intervals on histograms, areas are proportional to frequencies and the vertical axis is labelled 'Frequency density'.</i></li> <li>construct and use cumulative frequency diagrams</li> <li>estimate and interpret the median, percentiles, quartiles and interquartile range for cumulative frequency diagrams</li> <li>calculate the frequency density</li> <li>understand what is meant by positive, negative and zero correlation with reference to a scatter diagram</li> <li>draw a straight line of best fit by eye</li> </ul>	2 weeks
Total number of weeks				16 weeks

