

Unit	Notes	Examples	Applicable to:
2 BASIC OPERATIONS			
2.1 Place Value	<p>Recap concept of place value</p> <p>Reference to number line, for negative numbers</p>	<p>Put in the correct sign $< = > ()$,, between these numbers:</p> <p>(a) $3 \dots 5$ (b) $3 \dots -4$ (c) $-4 \dots -2$ (d) $-7 \dots -4$</p> <p>Arrange these numbers in increasing order:</p> <p>-4.2, 0.7, -1.9, 1.3, 2.8, 2.08</p> <p>What is the largest number that you can make using all the digits 2, 7, 5, 1 once and only once?</p>	<u>CIE</u>
2.2 Addition and Subtraction	<p>Whole numbers; decimals</p> <p>Mental calculations; using a calculator</p>	<p>Without using a calculator, what is</p> <p>(a) $152 - 87$ (b) $49 + 123$ (c) $2.7 + 4.9$ (d) $2.15 - 0.89$</p> <p>Calculate: (a) $2.705 + 4.3 + 0.045$</p> <p>(b) $2.477 - 1.869$</p> <p>(c) $7.2 - (4.5 - 2.7)$</p>	<u>CIE</u>
2.3 Multiplication and Division	<p>Whole numbers; decimals</p> <p>Mental calculations; using a calculator</p> <p>Multiplication and division by 10</p> <p>Order of operations (BODMAS)</p>	<p>Without using a calculator, what is</p> <p>a) 9×7</p> <p>b) 10×8.76</p> <p>c) $4.21 / 10$</p> <p>d) $4.9 / 0.7$</p> <p>Calculate</p> <p>a) 4.7×2.54 b) $2.85 / 2.5$</p> <p>Evaluate</p> <p>a) $8 \times (2 + 7)$ b) $-9 / (1 - 4)$</p>	<u>CIE</u>
2.3 Problems in Context.	Shopping bills, travel problems, etc	<p>A plant grows 12 cm per week for 2 weeks.</p> <p>How many days does it take to reach a height of 0.6 m?</p> <p>What is its height after (a) 1 week (b) 2 weeks ?</p>	<u>CIE</u>

Indices and Standard Form			
3.1 Index Notation	Recap notation		CIE
3.2 Laws of Indices	For positive integers: multiplying and dividing	$A^0 = 1$,	CIE
3.3 Negative Indices	Reciprocals		IE
3.4 Standard Form	Multiplying and dividing by powers of 10 Writing numbers in standard form Convert standard form to decimal numbers Calculations, with or without a calculator Use and understanding of calculator display	Write in standard form: (a) 52 (b) 5200 (c) 0.52	IE
3.5 Fractional Indices	Unitary fractions only		IE

4 FRACTIONS and PERCENTAGES			
4.1 Equivalent Fractions	Identifying equivalent fractions Ordering fractions		CIE
4.2 Fractions of Quantities	Numerically and in context		CIE
4.3 Operations with Fractions	Addition and subtraction; same denominator and different denominator Multiplying and dividing Problems in context		CIE
4.4 Fraction, Decimal and Percentage Equivalents	Conversion and equivalence	Write as (a) a fraction (b) a decimal, the percentage Equivalents (i) 75% (ii) 15% (iii) 12.5% Write as (a) a percentage (b) a fraction, the decimal (i) 0.12 (ii) 0.3 (iii) 2.75	CIE
4.5 Percentage Increases and Decreases	Finding percentages Calculating percentage increase/ decrease Applications	What is 15% of £40 ? coat is decreased in price from £50 by 12%. What is the new price? A bank account pays interest yearly at 5%. How much is an initial investment of £200 worth after 3 years if the interest is added to the account at the end of each year?	CIE

5 LINEAR GRAPHS AND EQUATIONS			
5.1 Coordinates	Recap coordinates in all 4 quadrants	Plot the points (2, -1), (4, 2) and (-3, -2) on coordinate axes. What are the coordinates of the points marked on the axes shown?	CIE
5.2 Straight Line Graphs	Recap concepts from Y8 Coordinates: plotting points Drawing graphs of straight lines General equation, $y=mx+c$; interpretation of m and c	Plot the points (4, 2), (1, 1), (-5, -1) on coordinate axes. Draw the straight line that goes through these point What is the equation of the line of gradient 2 and intercept with the y-axis - 1	CIE
5.3 Linear Equations	Recap Graphical illustration		CIE
5.4 Parallel and Perpendicular Lines	Appreciate that $y = mx + c$, for constant m , gives a set of parallel lines. Appreciate that $y = -\frac{1}{m}x + c$ is perpendicular to $y = mx + c$		CIE E
5.5 Simultaneous Equations	Linear, graphical and analytical approaches		CIE
5.6 Equations in Context	Direct proportion Equations resulting from word problems	A removals firm charges £4 per mile with a fixed charge of £25. What distance has been travelled if the bill (excluding VAT) is £93 ?	CIE

6 PROBABILITY			
6.1 The Probability Scale	Number scale 0 – 1 Probability scale in words	On the scale illustrate your estimate of the probability that: (a) it will rain tomorrow, (b) there will be a general election in this country next year, (c) someone in the school will have a birthday tomorrow.	CIE
6.2 The Probability of a Single Event	Equally likely events Relative frequency for estimating probabilities Estimating numbers of outcomes	A spinner has 8 equally likely outcomes. If the spinner is spun once, what is the probability of obtaining: (a) the number 7, (b) an even number, (c) a prime number ? Estimate the probability of a drawing pin landing tip- up. If you roll a fair dice 30 times, how many 6s do you expect to get?	CIE
6.3 The Probability of Two Events	Listings, tables, tree diagrams Independent events	A bag contains 5 RED and 3 BLUE balls. Two balls are picked at random, one at a time, with replacement. What is the probability of obtaining: (a) two RED balls, (b) two balls of different colours? Two fair dice are thrown. What is the probability of obtaining a total of 10 or more?	CIE
6.4 Theoretical and Experimental Probabilities	Comparing experimental values with theoretical values	What are the expected frequencies of the totals 2, 3, ... , 12 when two fair dice are thrown 72 times? Perform the experiment and compare the observed values with the expected values	CIE

7 TRANSFORMATIONS			
7.1 Shapes	Recap basic definitions of 2- D shapes Similarity and congruence	What is the name of a 2- D shape that has four equal sides? Which of these shapes are (a) congruent, (b) similar?	CIE
7.2 Translations	Recap coordinates Translations expressed as column vectors	What effect does the translation $\begin{pmatrix} 1 \\ 5 \end{pmatrix}$ have on the unit square formed by (0, 0), (0, 1), (1, 1), (1, 0) ? The point (3, 5) moves under a translation to (1, 7). Describe the translation using a column vector.	CIE
7.3 Enlargements	Drawing enlarged shapes (on squared paper) but without using centres of enlargement Enlargement with positive integer scale factor from a given centre of enlargement (with or without shape) including fractional scale factors Finding centre of enlargement and scale factor	Draw an enlargement of the triangle opposite using a scale factor of 4. What is the scale factor of this enlargement The triangle formed by the points (2, 3), (4, 5) and (6, 9) is enlarged, scale factor 2, centre of enlargement at (0, 0). Draw the triangle and its enlargement	CIE
7.4 Reflections	Line symmetry; simple examples with mirror lines Equation of line of reflection for horizontal and vertical mirror lines	Reflections in $y=0$, $x=0$, $y=-2$, etc. $y=x$, $y=-x$ Reflect the triangle formed by joining the points (1, 1), (4, 1) and (1, 2), in: (a) x -axis, (b) y -axis, (c) $y = 2$ (d) $y = -x$	CIE
7.5 Rotations	Rotational symmetry Centre of rotation; 90 °, 180 ° rotation; clockwise and anticlockwise	What is the order of rotational symmetry of these shapes: (a) (b) Rotate the rect anticlockwise about the origin.	CIE

8 STATISTICAL DIAGRAMS			
8.1 Data Collection, Extraction and Presentation	<p>Recap: primary and secondary data</p> <p>Collecting data; tally charts</p> <p>Extracting data; tables and charts</p> <p>Recap use of pictograms, bar charts, stem and leaf plots, vertical line diagrams, line graphs</p>	<p>Use a tally chart to note the number of people in each car passing your home in one hour.</p> <p>Illustrate the data in a variety of ways.</p> <p>Use a map mileage chart to find the distance from Newcastle to Bristol.</p> <p>Using the current train timetable, what is the latest time you can leave Cardiff in order to arrive at Paddington by 1100 hours at the latest? How long does the journey take?</p>	CIE
8.2 Statistical Measures	<p>Recap mean, median, mode and range for discrete data; extension to grouped data</p>	<p>For the data set { 1, 2, 2, 3, 3, 3, 4 }, find the mean, median, mode and range.</p> <p>Data on the number of minutes that a particular train service was late have been summarised in the table (times to nearest minute).</p> <p>(a) How many journeys have been included?</p> <p>(b) What is the modal group?</p> <p>(c) Estimate the mean number of minutes the train is late for these journeys.</p>	CIE
8.3 Plotting Scatter Diagrams	<p>Plotting data points</p> <p>Understanding what is meant by correlation (perfect, positive and negative, strong and weak, zero)</p>	<p>Maths and Science test marks for 10 pupils are given below:</p> <p>Plot these points on a scatter diagram. What sort of correlation do they illustrate?</p> <p>Describe the correlation illustrated in these diagrams:</p>	CIE
8.4 Lines of Best Fit	<p>Finding the line of best fit, by eye (and understanding the basis for it)</p>	<p>For the examples above, draw in lines of best fit, by eye.</p>	CIE
8.5 Equation of Line of Best	<p>Finding the equation of the line of best fit in the form</p>	<p>Find the equation of the line of best fit for the examples above.</p>	IE

Units	Notes	Examples	Applicable to
9 AREA, PERIMETER and VOLUME			
9.1 2- D Shapes	Recap common names, and properties of 2- D shapes	What is the name of each shape illustrated? Draw on the lines of symmetry and state the order of rotational symmetry for each shape.	CIE
9.2 Area of Special Shapes	Square, rectangle, parallelogram, triangle, circle and compound shapes	Find the area of the following shapes:	CIE
9.3 Perimeter of Special Shapes	Square, rectangle, circle and compound shapes	Find the perimeter lengths of the shapes above. Find the perimeter length of the semicircle.	CIE
9.4 Surface Area and Volume of 3- D shapes	Recap common names (cube, cuboid, prism and cylinder) Volume and surface area of these shapes	Find the (a) volume, (b) surface area of each of these shapes:	CIE

10 SEQUENCES			
10.1 Constant Differences	Generating sequence from formula	Write down the first 5 terms of the sequence defined by $6n - 2$ ($n = 1, 2, 3, \dots$) What do You notice about the differences?	CIE
10.2 Finding the Formula	Determining general term for sequence	What is the general term for the sequence $7, 10, 13, 16, 19, \dots$?	CIE
10.3 Linear and Quadratic Differences	Generating sequence from formula Understanding the consequences of having constant linear or quadratic differences	Write down the first 6 terms for the sequences defined by: $u_n = n^2 + n + 1$ $u_n = 2n^2 - n$ What do you notice about the differences for each sequence? What is the general term for the sequence $-1, 0, 3, 8, 15, \dots$?	CIE
10.4 Special Sequences u	Recognise common sequences such as Fibonacci and exponential sequences	Find the first 10 terms of the sequence defined by	E

	<p>Sequences of the form</p> $u_n = \frac{an + b}{cn + d}$	$u_n = u_{n-1} + u_{n-2}$ <p>Investigate the limit as $n \rightarrow \infty$ for the value of the nth term, where</p> $u_n = \frac{n}{n+1}$	
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12 ANGLES, CONSTRUCTIONS and LOCI			
12.1 Constructions using ruler and protractor.	Drawing lines and angles accurately Constructing triangles given SSS, SAS, ASA and RHS (noting that SSA is not unique) Midpoint and perpendicular bisector of a line segment Perpendicular from a point to a line Perpendicular from a point on a line Constructing 90 60 120 , angles Bisecting an angle, to get for example, 45 30 angles,	Draw accurately line AB of length 8.2 cm and angle $CAB = 37^\circ$ with $CA = 4.7$ cm, Construct triangle with sides of lengths 8 cm, 7.3 cm, 6.7 cm. Construct the midpoint and perpendicular bisector of the line AB, shown below: Also construct the perpendicular from the point C to the line AB.	CIE

13 GRAPHS, EQUATIONS and INEQUALITIES			
13.1 Linear Inequalities	Using number lines to find and illustrate solutions Solving linear inequalities of the form $a x + b < c$	Illustrate $-1 < x \leq 2$ on a number line. Solve for x : (a) $2x > 8$ (b) $2x + 6 \geq 3$ (c) $13 \leq 1 + 4x$ (d) $1 \leq 2x - 3 \leq 7$	CIE
13.2 Graphs of Quadratic Functions	Plot graphs of quadratic functions, given formulae Appreciate their characteristics Drawing graphs of straight lines General equation, $y = mx + c$; interpretation of m and c	Describe and illustrate the set of graphs, Draw the graph of $y = 2x + 1$ What is the equation of the line of gradient 2 and intercept with the y -axis -1 ?	CIE
13.3 Graphs of Cubic and Reciprocal.	Plot graphs of cubic functions, given formulae, and Functions appreciate their general shape and characteristics Plot graphs of reciprocal functions, given formulae	Sketch graphs of: Draw graph of Draw the graph of. Where does it intersect	IE

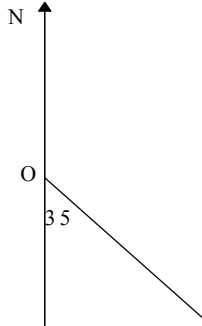
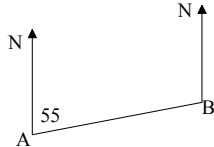
		the straight line $y=2x$?	
13.4 Solving Non- Linear Equations	Trial and improvement (recap)	Find approximate solutions of the equation using (a) graphical method, (b) trial and improvement.	IE
13.5 Quadratic Inequalities	Finding solutions to quadratic inequalities, when expression factorises Appreciate that $y = -\frac{1}{m}x$ is perpendicular to $y=mx+c$	Give three lines which are parallel to $y = 4-2x$ and one line that is perpendicular. Draw graphs of the lines.	

14 ESTIMATION and APPROXIMATION			
14.1 Rounding	<p>Rounding whole numbers and decimals to given number of</p> <p>(a) nearest 10, 100, etc.</p> <p>(b) significant figures</p> <p>(c) decimal places</p>	<p>Round 27651 to the nearest (a) 100 (b) 1000</p> <p>Write 4749 to (a) 3 significant figures, (c) 2 significant figures.</p> <p>Write 27.493 to (a) 2 d. p. (b) 1 d. p. (c) 3 significant figures</p>	CIE
14.2 Estimation	<p>Estimating the values of complex calculations</p> <p>Appreciating the order of magnitude of expressions</p>	<p>Estimate the value of</p> <p>Which of the following answers is the correct value of</p>	CIE
14.3 Calculator Use	<p>Efficient use of calculators; memory and brackets</p>		CIE

15 TRIGONOMETRY			
15.1 Pythagoras' Theorem	Recap; Pythagorean triples		CIE
15.2 Trigonometric Functions	Definitions for right- angled triangles; common values		IE
15.3 Calculating Sides	For right- angled triangles, with given angle and side Questions in context		IE
15.4 Calculating Angles	Right- angled triangles with 2 sides given Questions in context		IE

16 CUMULATIVE FREQUENCY			
16.1 Averages	Recap: data collection and measures of central tendency (mean, median and mode); range	Measure (a) heights, (b) weights, of all members of class. Choose appropriate class intervals to summarise data.	CIE
16.2 Grouped Data	Representation by bar charts with equal class intervals Frequency polygons Estimating mean and modal class	Use (a) bar chart, (b) frequency polygon, to summarise data above.	CIE
16.3 Cumulative Frequency	Cumulative frequency graphs (polygons)	Find the shoe size of all Y9 pupils in your school. Illustrate this with a cumulative frequency graph.	IE

17 QUADRATIC FUNCTIONS			
17.1 Quadratic Expressions	Recap concept; quadratic formulae Change of graph for $y = a x^2 + bx + c$ for varying a, b, c		CIE
17.2 Quadratic Equations: Factorisation	Factorising simple quadratic expression Solving quadratic equations by factorisation		CIE

18 BEARINGS			
<p>18.1 3 figure bearings</p>	<p>Concept</p> <p>Reasons why there are always 3 figures</p> <p>Rules: Turning clockwise from North</p> <p>Drawing and interpreting three figure bearings</p>	<p>Draw a diagram to illustrate a bearing of</p> <p>a) 30° b) 150° c) 315°</p> <p>Give the bearing shown by the diagram below</p> 	<p>CIE</p>
<p>18.2 Paired bearings</p>	<p>Finding the bearing of A from B and vice versa</p>	<p>For the diagram below give the bearing of A from B and B from A</p> 	<p>IE</p>

19 RATIO			
19.1 Expressing ratio in simplest form	Recap: use of ratio How to express a ratio in its simplest form	Express 15:20 in its simplest form. Express 1.5:6 in its simplest form	CIE
19.2 Splitting amounts into given ratio	Solving everyday problems by splitting amounts according to a given ratio	Split \$21 in the ratio 3:4	CIE
19.3 Expressing ratio in unitary form	Expressing ratios in the form 1:n or n:1	Express 34: 65 in the form 1:n	CIE
19.4 Direct proportion	Solving problems of direct proportion	If 4 pencils cost \$30 – how much would 9 cost?	CIE
19.5 Inverse proportion	Recognising and solving problems using inverse proportion	9 men take 30 days to build a house. How long would 4 take?	IE

20 SAMPLING			
20.1 Random Samples	<p>Concept of random samples, and why they are needed</p> <p>Differences between samples and census</p> <p>Advantages and disadvantages</p>	<p>Use a table of random numbers to find a sample of size 10 from a population of size 200.</p> <p>advantages / disadvantages of a sample rather than a census?</p>	CIE PROJECT IF TIME PERMITS
20.2 Sampling Techniques	<p>Different methods of sampling; systematic sampling</p> <p>advantages / disadvantages</p>	<p>When is it applicable to use a quota sample?</p> <p>e. g. quota sampling,</p> <p>Explain how to find a systematic sample of size 10 from a population of size 200</p>	CIE PROJECT IF TIME PERMITS
20.3 Stratified Samples	<p>Concept of the need for stratified samples</p>	<p>Explain how to find stratified sample of size 30 to represent the views of a school population</p>	CIE PROJECT IF TIME PERMITS

Notes:

C= Core I=Intermediate E=Extended All shaded topics refer to revision. The amount of revision required will be particular to each group, revision and extension of knowledge to more difficult questions will be the norm in these cases.

