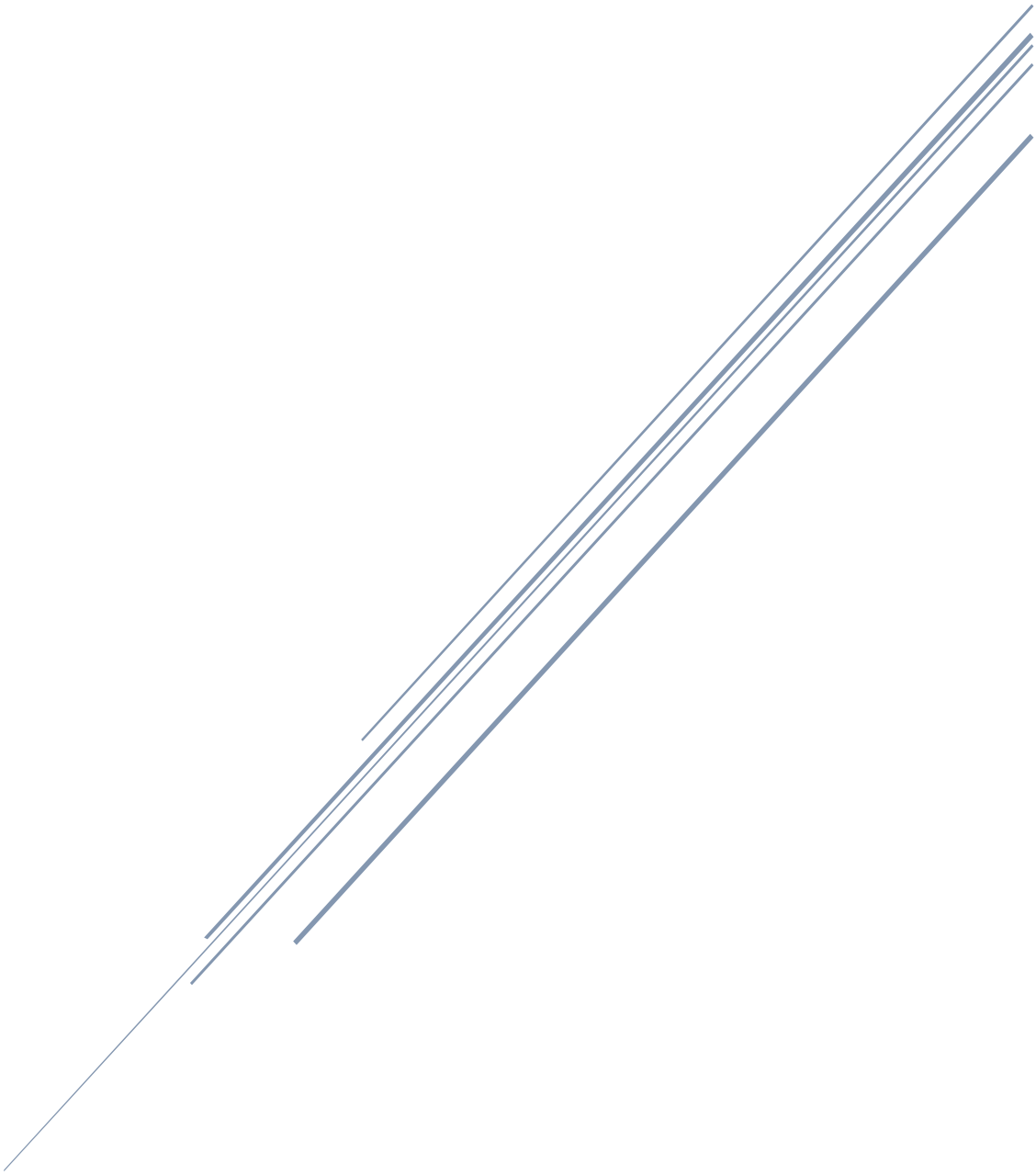
MATHEMATICS SYLLABUS

Year 10 Lev 3



Learning Outcomes Framework

September 2022

Year 10 Lev 3		Ref to SEC
Strand 1: Learning Area Outcome: I understand the structure of the number system and the relationship between numbers. Subject Focus: Number – The number system		

Strand 2: Learning Area Outcome: I can calculate using mental methods, pencil and paper methods, and, assistive technology methods. I can check calculations by rounding numbers and making rough approximations. I can calculate to the most appropriate level of accuracy. I can also check the reasonableness of answers. Subject focus: Number **–** Numerical calculations		
27	I can use prime factorisation to work out the square root of large numbers and to work out the LCM and HCF.	1.3y/z/aa
28	I can work out problems involving the HCF.	1.3aa/bd
51	I can convert percentages (>100%) to fractions and vice versa	2.3an
52	I can convert percentages (>100%) to decimals and vice versa	2.3an
53	Find the percentage of a quantity where the percentage ≥100%. E.g. (i) Find 120% of 95 m. E.g. (ii) The population of a small village is 850. After one years it increased by 140%. How many new people went to live in the village during this year?	2.3am
54	Express a quantity as a percentage of another where the percentage ≥ 100% and the percentage error > 0%. E.g. (i) Express 550 m as percentage of 80 m. E.g. (ii) 20 years ago, the price of gold was €9.61 per gram and now it is €56.07 per gram. Calculate the percentage change in the price of gold per gram. E.g. (iii) I thought 70 people would turn up to the concert, but in fact 80 did. What is my percentage error?	2.3ao
55	I can work through situations involving percentage increase and decrease, (e.g. cost and selling price; discounts; profit and loss and percentage error).	2.3ap/ao
56	I can work out reverse percentage calculations.	2.3aq
57	**I can work through situations involving successive percentage changes.**	**2.3ar**
60	I can work out compound interest, appreciation and depreciation, working step by step.	2.3at
61	**I can work out the compound interest, the appreciation and the depreciation using the formula.**	**2.3au**
63	**I can work out the number of repayments needed to repay a loan.**	**2.3av**
64	**I can work out the total accrued yearly value of an investment.**	**2.3au**
65	I know the difference between selling rate and buying rate in currency exchange rates. I can use buying rate and selling rate to convert currencies.	2.3aw
67 **67**	I can work through complex situations involving personal and household finance (e.g. earnings, **loans**, simple and **compound interest**, income tax and VAT)	2.3ay/**bs**
70	Work through complex situations involving ratios (excluding area and volume).	2.3bs

	e.g. A mixture of 900 g contains sugar and flour in the ratio 1:2. How much sugar should be added to change the ratio of the mixture to 2:3?	
74	I can use the rules for multiplying and dividing powers of numbers (integral positive, negative and zero indices) (i) $7^8 \times 7^{-5} = 7^3$ (ii) $6^5 \div 6^{-2} = 6^7$ (iii) $(2^3)^5 = 2^{15}$ (iv) $9^0 = 1$	2.3bh
75	I can apply the four rules on numbers in standard form.	2.3bk
76	I can use assistive technology (e.g. tablets, computers and calculators) and other resources (e.g. Cuisenaire rods, Unifix cubes, base 10 blocks) appropriate to this level to calculate and to learn about numerical calculations.	2.3bq
77	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	2.3bs
	I can use appropriate mathematical processes to work on tasks and/or activities that are related to mathematical content at this level and which involve one or more modes of assessment such as solving, investigating, modelling, maths trails, and research projects.	2.3br

Strand 3: Learning Area Outcome: I can recognise and describe patterns and relationships in various mathematical ways and can use algebraic manipulations. Subject Focus: Algebra **–** Fundamentals of Algebra		
10	**I can expand two brackets of the form $(ax \pm b)(cx \pm d)$ and $(ax \pm b)^2$.**	**3.3l**
12	I can use the four operations on algebraic fractions with numerical denominators.	3.3p
15	I can change the subject of the formula that includes squares, cubes, square roots and cube roots and when the subject letter occurs more than once. E.g. Make r the subject of the formula: $V = \frac{4}{3}\pi r^3$ E.g. Make g the subject of the formula $T = 2\pi\sqrt{\frac{L}{g}}$	3.3u/v
18	I can represent a simple linear inequality (<, >, ≤, ≥) on a number line, e.g. represent $x \geq 9$ on a number line.	3.3ai
18	**I can solve simple linear inequalities in one variable and represent the solution on the number line.** **e.g. $2x + 5 > 7$**	**3.3aj**
20	**I can factorise quadratic expressions involving trinomials and difference of two squares.**	**3.3n**
22	**I can solve quadratic equations by factorisation.**	**3.3ac**
23	**I can solve quadratic equations by using the formula.**	**3.3ad**
24	**I can solve equations involving algebraic fractions with linear denominators**	**3.3ae**
25	**I can find approximate solutions to equations for which there is not a simple method of solution using the trial and improvement method. e.g. Solve for x: $x^3 - 2x = 100$**	**3.3ag**
41	**I can solve graphically two simultaneous equations: one linear and one quadratic.**	**3.3ab**

44	**I can use quadratic graphs to solve quadratic equations.** **E.g. Use the graph of $y = 2x^2 - 4$ to solve the equation $2x^2 - 2x - 7 = 0$**	**4.3y**
49	I can use the rules for multiplying and dividing powers (positive, negative and zero indices) i) $2a^8 \times 3a^{-5} = 6a^3$ ii) $6y^5 \div 3y^{-2} = 2y^7$ iii) $(2c^3)^5 = 32c^{15}$ iv) $x^0 = 1$ v) $x^{-2} = \frac{1}{x^2}$	3.3t
52	I can use assistive technology (e.g. tablets, computers and calculators) and other resources (e.g. algebra blocks) appropriate to this level to learn about the fundamentals of algebra.	3.3am
53	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	3.3ao
	I can use appropriate mathematical processes to work on tasks and/or activities that are related to mathematical content at this level and which involve one or more modes of assessment such as solving, investigating, modelling, maths trails, and research projects.	3.3an

Strand 4: Learning Area Outcome: I understand and can use forms of measurement and can make reasonable estimations.

Subject Focus: Shape, Space & Measures – Measures

8	I can use the trigonometric ratios to find unknown lengths and angles in right-angled triangles.	5.3u
10	I can use trigonometric ratios to work through situations involving angles in bearings in 2D.	5.3w
34	I can calculate the area of a sector of a circle.	5.3aw
35	I can calculate the area of compound shapes that include sectors of circles.	5.3ax
37	I can derive and use a formula for the volume of a prism and can calculate the surface area of a prism.	5.3az/ba
38	**I can calculate:** **i) the surface area of a square- based right- pyramid;** **ii) the surface area of a right circular cone;** **iii) the surface area of a sphere;** **iv) the volume of a square-based right-pyramid;** **v) the volume of a frustum of a square-based right-pyramid;** **vi) the volume of a right circular cone;** **vii) the volume of a frustum of a right-circular cone;** **viii) the volume of a sphere.**	**5.3bc/bd**

54	I can use assistive technology (e.g. tablets, computers and calculators) and other resources (e.g. 2D and 3D plastic shapes, measuring instruments) appropriate to this level to learn about measures.	5.3bw
55	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	5.3by
	I can use appropriate mathematical processes to work on tasks and/or activities that are related to mathematical content at this level and which involve one or more modes of assessment such as solving, investigating, modelling, maths trails, and research projects.	5.3bx

Strand 5: Learning Outcome: I can recognise and describe the properties of shapes. I can use these properties to construct shapes using appropriate mathematical instruments and to prove geometric statements.

Subject focus: Shape Space and Measures – Euclidean Geometry

22	I can identify a tangent to a circle.	6.3au
23	I can interpret and apply the circle theorems. i) The opposite angles of a cyclic quadrilateral are supplementary. (Angles in opposite segments are supplementary). ii) The exterior angle of a cyclic quadrilateral is equal to the interior opposite angle. iii) The angle between the radius and the tangent at the point of contact is a right angle. iv) Equal chords are equidistant from the centre. v) Chords which are equidistant from the centre of a circle are equal. vi) The perpendicular bisector of a chord passes through the centre. vii) A straight line drawn from the centre of a circle to bisect a chord is at right angles to the chord. viii) If two tangents are drawn to a circle from a point outside the circle, then: a) the tangents are equal in length b) the angle between the tangents is bisected by the line joining the point of intersection of the tangents to the centre; c) this line also bisects the angle between the radii drawn to the points of contact.	6.3ba 6.3bb 6.3bc 6.3bd 6.3be 6.3bf 6.3bg 6.3bh
23	**If a straight line touches a circle, and from the point of contact a chord is drawn, the angle which the chord makes with the tangent is equal to the angle in the alternate segment.**	**6.3bi**
24	I can construct (using a straight edge and compasses only): i) the perpendicular bisector of a line segment ii) the perpendicular from a point to a line	7.2d 7.2e

	iii) the perpendicular at a point on a line iv) the angle bisector of a pair of intersecting lines	7.2f 7.2g
25	I can construct triangles given various conditions using a ruler and compasses only.	7.3j
29	I can explain the concept of congruency. I can identify congruent shapes.	6.3x 6.3y
30	I can prove two triangles are congruent using SSS, SAS, ASA and RHS. I can use the fact that two triangles are congruent in order to find the lengths of missing sides and angles.	6.3z
34	I can use assistive technology (e.g. tablets and computers, including dynamic geometry software packages and LOGO) and other resources (e.g. 2D and 3D plastic shapes) appropriate to this level to learn about properties of shapes.	6.3bv
35	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	6.3bx
	I can use appropriate mathematical processes to work on tasks and/or activities that are related to mathematical content at this level and which involve one or more modes of assessment such as solving, investigating, modelling, maths trails, and research projects.	6.3bw

Strand 6: Learning Area Outcome: I can describe position and movement of shapes in a plane Subject Focus: Shape, Space & Measures – Transformation Geometry		
8	I can deduce that reflections preserve length and angle.	8.3f
14	**I can find the centre of rotation by inspection and/or by construction, limited to angles of rotation of 90°and 180°.**	**8.3k**
15	I can deduce that rotations preserve length and angle.	8.3l
16	I can deduce that translations preserve length and angle.	8.3n
17	I can draw and describe enlargements of a shape using the centre of enlargement and positive scale factors (integral and fractional).	8.3o/p
18	I can deduce that enlargements preserve angle but not length.	8.3q
20	**I can transform 2D shapes by a combination of transformations**	**8.3s**
21	I can use assistive technology (e.g. tablets and computers) and other resources (e.g. 2D and 3D plastic shapes) appropriate to this level to learn about transformation geometry.	8.3w
22	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	8.3y
	I can use appropriate mathematical processes to work on tasks and/or activities that are related to mathematical content at this level and which involve one or more modes of assessment such as solving, investigating, modelling, maths trails, and research projects.	8.3x

Strand 7: Learning Area Outcome: I can collect, analyse, interpret and communicate statistical information

Subject Focus: Data Handling & Chance – Statistics		
4	I can interpret data from stacked and clustered bar charts.	9.3j
5	 I can construct stacked and clustered bar charts.	9.3k
14	I can find an estimate of the mean of a set of grouped data from a frequency table.	9.3aa
16	I can find the class interval in which the median of a set of data lies from a grouped frequency table	9.3af
17	I can identify the modal class from a grouped frequency table.	9.3ag
23	I can use assistive technology (e.g. tablets, computers and calculators) and other learning resources to learn about probability	9.3an
24	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	9.3ap
	I can use appropriate mathematical processes to work on tasks and/or activities that are related to mathematical content at this level and which involve one or more modes of assessment such as solving, investigating, modelling, maths trails, and research projects.	9.3ao

Strand 8: Learning Area Outcome: I understand ideas of chance and uncertainty Subject Focus: Data Handling & Chance – Probability		
9	I can work out the probability of mutually exclusive events.	10.3j
11	**I know the difference between dependent and independent events.**	**10.3m**
12	**I can work out the probability of dependent events.**	**10.3n**
13	**I can construct and use a probability tree (tree diagram) to work out the probability of independent and dependent events.**	**10.3n/o**
14	I can use assistive technology (e.g. tablets, computers and calculators) and other learning resources to learn about probability	10.3q
15	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	10.3s
	I can use appropriate mathematical processes to work on tasks and/or activities that are related to mathematical content at this level and which involve one or more modes of assessment such as solving, investigating, modelling, maths trails, and research projects.	10.3r

Assessment criteria in **bold** type refer to <u>extension</u> level 3*