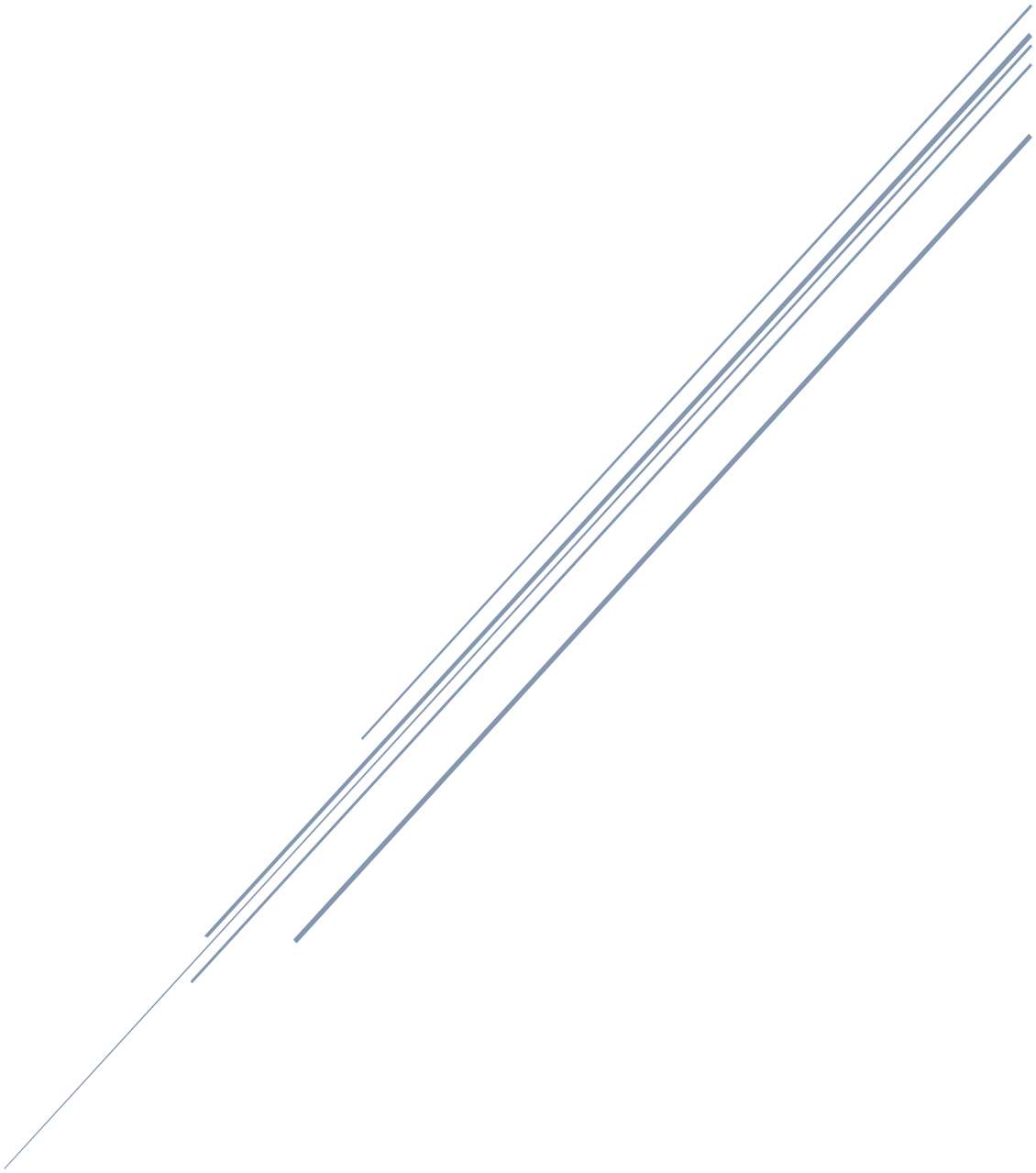
SYLLABUS - MATHEMATICS

Year 9 Lev 3



Learning Outcomes Framework

September 2022

Year 9 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		
2	**I am able to use the number line to illustrate simple inequalities.**	**3.3ai**
14	I can identify all the common factors of up to three numbers.	1.2r
15	I can identify the highest common factor (HCF) of up to three numbers.	1.3r
39	I can convert numbers in ordinary form to standard form and vice-versa.	1.2/3ax/ay
40	I can find the reciprocal of a number.	1.3az
41	I can use assistive technology (E.g. tablets, computers & calculators) and other learning resources to learn about numbers and their properties	1.3bb
42	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	1.3bd
	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.	1.3bc

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		
25	I can use rounded numbers to make rough approximations. *E.g.* i) $37 \times 5.8 \approx 40 \times 6 = 240$ ii) $\sqrt{80} \approx 9$; iii) $1.8^3 \approx 8$. I can round up or round down decimal numbers to the nearest whole number depending on the context. *E.g.* How many 50-seater buses are needed to transport 130 students? How many yoghurts can be bought with €5, if each yoghurt costs €1.30?	2.2/3bl 2.1bn
26	I can work out mental calculations involving powers and roots. *E.g. √1600, 90², 20³, ³√8000.*	2.2q
27	I can express any integer as a product of prime factors.	1.2w
41	I can round any decimal number to a given number of significant figures.	2.3bo
53	I can find the percentage of a quantity where the percentage <100%. E.g. (i) Find 62% of €88.00 E.g. (ii) 2.5 % of 250 l of water is lost. How much water is lost?	2.2am
54	I can express a quantity as a percentage of a larger quantity.	2.2ao

55	I can work through simple situations involving percentage increase and decrease (<100%) e.g. finding the discount, profit, loss and selling price, excluding reverse percentage calculation)	2.2ap
58	I can work out the simple interest, the principal, the rate, the time or the amount.	2.3as
59	I can use the simple interest formula.	2.2as
67	I can work through complex situations involving personal and household finance. (*E.g.* earnings, simple interest and VAT.)	2.3ay
71	I can draw and interpret scale drawings, excluding area, involving 2D plans, scale drawings, bearings, angles of elevation and angles of depression.	2.2/3bd/be
73	I can work through situations that involve direct and inverse proportion	2.3bg
74	I can use the rules for multiplying and dividing powers of numbers (integral positive and zero indices) E.g. i) $7^3 \times 7^5 = 7^8$ ii) $6^5 \div 6^2 = 6^3$ iii) $(2^3)^5 = 2^{15}$ iv) $9^0 = 1$	2.2bh
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		
2	I can generate the terms of a sequence given the n^{th} term.	3.3e
3	I can use algebraic expressions to describe the n^{th} term of a linear sequence. E.g. $-3n-1$	3.3f
6	I can use algebraic notation to represent two or more unknown values in expressions.	3.2h
8	I can simplify non-linear algebraic expressions by collecting like terms.	3.3i
9	I can simplify non-linear algebraic expressions by multiplying a single term over a bracket. E.g. $2x(3x+4y)-x(x-y)$	3.3k
10	**I can expand two brackets of the form $(x \pm a)(x \pm b)$ and $(x \pm a)^2$.**	**3.3l**
13	I can simplify algebraic fractions with linear algebraic denominators. E.g. Simplify: $\frac{4}{2x+4}$	3.3q
14	I can evaluate non-linear expressions and formulae by substituting directed numbers.	3.3g

15	I can change the subject of the formula that includes squares and square roots and when the subject letter occurs more than once. E.g. Make r the subject of the formula $V = \pi r^2 h$ E.g. Make a the subject of the formula: $P = 2ab + 3a$	3.3u/v
16	I can form and solve linear equations involving an unknown and integers or fractions (with numerical denominators) on both sides.	3.3w
19	I can factorise expressions by using the common factor method.	3.3m
21	I can solve algebraically two simultaneous linear equations.	3.3aa
29	I can construct tables of values for quadratic functions.	4.3d
30	I can plot the graph of a quadratic function from a table of values.	4.3f
34	I can find the gradient of a line from the coordinates of any two points on the line.	4.2l
35	I can write the equation of a straight line given the coordinates of two points or the line graph.	4.3m
39	I can compare information from two or more straight line graphs concerning real life situations.	4.3q
40	I can plot and solve graphically two simultaneous linear equations.	4.3s
42	I can identify the maximum or the minimum value from a quadratic graph.	4.3w
43	I can use quadratic graphs to find the value of a coordinate given the other.	4.3x
45	I can interpret non-linear graphs arising from real life situations. E.g. the rise of water in a conical flask as it is being filled.	4.3p
49	I can use the rules for multiplying and dividing positive integer powers including zero index. *E.g.* i) $a^3 \times a^5 = a^8$ ii) $y^5 \div y^2 = y^3$ iii) $(c^3)^2 = c^6$ iv) $x^0 = 1$	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		
2	I can draw, interpret and use three-figure bearings.	5.3b/c/d

7	I can define the trigonometric ratios (sine, cosine and tangent) as the ratios of sides in a right-angled triangle.	5.3t
8	I can use the trigonometric ratios to find unknown lengths and angles in right-angled triangles.	5.3u
9	I can interpret angles of elevation and depression.	5.3v
10	I can use trigonometric ratios in situations that involve angles of elevation and/or depression.	5.3w
36	I can calculate the length of an arc of a circle.	5.3av
37	I can derive and use the formula for the surface area and volume of a cylinder.	5.3ay/az/ba/bb
39	I can find missing dimensions of 3D shapes. E.g. A cube has a volume of 1000 cm^3. Calculate the length of the side of the cube.	5.3bf
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

1	I can distinguish between lines and line segments.	6.2a
10	I can interpret and use Pythagoras' Theorem in 2D shapes.	5.3mn
11	I can interpret and use the converse of Pythagoras' Theorem in 2D shapes. I can deduce that a triangle whose sides are in the ratio of 3:4:5 or in the ratio of 5:12:13 is a right-angled triangle.	5.3prs
16	I can describe the properties of regular polygons related to sides, angles & diagonals, and can describe their reflective and rotational symmetry.	6.3ap
17	I can derive, calculate and use the sums of the interior and exterior angles of regular and irregular polygons.	6.3ap/aq/ar/as/at
19	I can draw the plan, front elevation and side elevation of a cube and cuboid.	6.2bm/bn/bo
21	I can draw the net of a cube, a cuboid, a triangular prism and a square-based right pyramid.	6.3bt
22	I can identify, name and draw a chord, an arc, a sector, and a segment of a circle.	6.3au/av/aw
23	I can interpret and apply the circle theorems: i) The angle in a semicircle is a right angle. ii) The angle which an arc of a circle subtends at the centre is twice that which it subtends at any other point on the remaining part of the circumference. iii) Angles in the same segment of a circle are equal.	6.3ax/ay/az
26	I can construct regular polygons using ruler, protractor and compasses.	7.3m

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		
19	I can create tessellating shapes and draw a tessellation.	8.2t/u
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.	8.2/3w
22	I can work on tasks and activities including worded problems that are related to mathematical content in this strand at this level.	8.2/3y
	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.	8.2/3x

Strand 7: Learning Area Outcome: I can collect, analyse, interpret and communicate statistical information. Subject Focus: Data Handling & Chance – Statistics		
1	I can explain the difference between discrete and continuous data.	9.3a
2	I can represent data in the form of an inequality. E.g. The age P in years of under 21 players should be at least 16 but less than 21, i.e. $16 \leq P < 21$	9.3b
3	I can construct a frequency table using grouped continuous data.	9.3g
11	I can interpret a histogram with equal class intervals.	9.3q
12	I can construct a histogram with equal class intervals.	9.3r
14	I can find the mean of a set of ungrouped data from a frequency table.	9.2z
16	I can find the median of a set of ungrouped data from a frequency table.	9.2ae
17	I can find the mode of a set of ungrouped data from a frequency table.	9.2ag
18	I can find the range of a set of ungrouped data from a frequency table.	9.2ah
23	I can use assistive technology (E.g. tablets, computers and calculators) and other learning resources to learn about statistics.	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		
4	I can work out the probability of an event from a frequency table.	10.3d

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 extension level 3*