

MATHEMATICS SYLLABUS – (SEC Exam 2023 and Year 11 Annual 2023 only)

Year 11 Track 3

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Year 11 – Track 3: Number and Applications

SMP Interact Mathematics for Malta: Higher Level

Ch	Mod	Learning Outcome:	Pg	Level	SEC	Notes
31	NN34	i. Understand and use limits of accuracy.	314		Ext	E.g. Measured lengths and weights. • Include problems involving addition and multiplication, subtraction, and division. E.g. The calculation of the perimeter/area of a rectangle and speed, given data to a specified accuracy.
	NN34	ii. Give appropriate upper and lower bounds for data given to a specified accuracy.				
	NN34	iii. Obtain appropriate upper and lower bounds to solutions of simple problems.				
39	NN35	i. Use the index laws for positive and negative fractional indices.	397		Ext	• Use a calculator to evaluate powers and roots.

Year 11 – Track 3: Algebra (i)

SMP Interact Mathematics for Malta: Higher Level

Ch	Mod	Learning Outcome:	Pg	Level	SEC	Notes
19	AL35	i. Solve simple linear inequalities in one variable.	192		Ext	<ul style="list-style-type: none"> Recognise, understand, and use integers. E.g. $2x - 3 > 7$ and $x - 1 \leq 2x \leq 4$
	AL35	ii. Represent the solution set on a number line.				
22	AL36	i. Use direct variation.	213		Ext	<ul style="list-style-type: none"> Use $c \propto L$ and $c = kL$
	AL36	ii. Use inverse variation.				<ul style="list-style-type: none"> Use $A \propto \frac{1}{n}$ and $A = \frac{1}{n}k$ or $An = k$.
	AL36	iii. Solve problems involving direct and inverse variation to determine unknown quantities.				<ul style="list-style-type: none"> Restrict to $y \propto x^n$, where $n = \pm 1, \pm 2, 3$.
23	AL37	i. Graph and interpret inequalities in one and two variables.	227		Ext	<ul style="list-style-type: none"> Include the solution of problems. E.g. $y \geq 3x$, $y \leq 5$ and $x + y > 4$.
	AL37	ii. Determine the solution to an inequality or set of inequalities on a graph by shading the appropriate regions.				
28	AL38	i. Construct tables of values for cubic functions and reciprocal functions of the type $f(x) = a/x$ to generate points and plot the graphs	276		Ext	<ul style="list-style-type: none"> Use pencil and paper, a spreadsheet or a graphing package. E.g. find graphically common solutions for $y = 2x - 1$ and $y = x^3$.
	AL38	ii. Solve graphically linear, quadratic, cubic and reciprocal functions simultaneously.				E.g. $x^3 - x = 80$
	AL38	iii. Use trial and improvement methods involving calculator and computer to find approximate solutions of equations for which there is not a simple method of solution.				
	AL38	iv. Use curve sketches to identify graphs.				
		v. Sketch curves by determining values of x and y at the points of intersection with the axes.				
	AL38	vi. Use graphs to solve problems.				<ul style="list-style-type: none"> To include positive and negative gradients. E.g. distance-time and velocity-time graphs, conversion graphs, graphs of height against age.
		vii. Interpret and understand rates of change presented in a variety of linear and non-linear graphs.				

Year 11 – Track 3: Algebra (ii)

SMP Interact Mathematics for Malta: Higher Level

Ch	Mod	Learning Outcome:	Pg	Level	SEC	Notes
34	AL39	i. Solve algebraically two simultaneous equations, one linear and one quadratic.	352		Ext	
38	AL40	i. Simplify algebraic fractions by factorising and cancelling.	386		Ext	<ul style="list-style-type: none"> Denominators to include linear and quadratic expressions.
	AL40	ii. Add and subtract algebraic fractions with linear denominators.				
	AL40	iii. Add and subtract algebraic fractions with quadratic denominators.				
	AL40	iv. Solve equations and problems involving fractions with algebraic denominators.				
	AL40	v. Rearrange harder formulae with fractions.				
39	AL41	i. Use and interpret fractional indices.	397		Ext	
41	AL42	i. Understand and use function notation.	425		Ext	E.g. $f(x) = 3x - 5$
	AL42	ii. Understand and use inverse function notation				E.g. if $f(x) = 3x - 5$ then $f^{-1}(x) = \frac{x + 5}{3}$

Year 11 - Track 3: Shape, Space and Measurement (i)

SMP Interact Mathematics for Malta: Higher Level

Ch	Mod	Learning Outcome:	Pg	Level	SEC	Notes
33	GG28	i. Understand the notion of similar shapes through enlargement.	325		Ext	<ul style="list-style-type: none"> • Appreciate that any two circles and any two squares are mathematically similar, whereas in general, two rectangles are not. • $\frac{L_2}{L_1} = k \mid \frac{A_2}{A_1} = k^2 \mid \frac{V_2}{V_1} = k^3$ • Use map ratios as a scale factor.
	GG28	ii. Prove triangles similar by showing that: <ol style="list-style-type: none"> corresponding angles are equal the corresponding sides of each triangle are in the same ratio which is equal to the scale factor (k) of the enlargement there is one pair of equal angles and the sides containing these angles are in the same ratio. 				
	GG28	iii. Solve problems involving similarity.				
	GG28	iv. Understand and use the relationship between length, area and volume of similar shapes.				
42	GG29	i. Understand the notion of congruent shapes.	437		Ext	<ul style="list-style-type: none"> • Appreciate that all congruent shapes are similar but similar shapes are not necessarily congruent. • Appreciate that the converse is also true. • Appreciate that the converse is also true.
	GG29	ii. Understand and use SSS, SAS, ASA/AAS and RHS conditions to prove the congruence of triangles.				
	GG29	iii. Solve problems involving congruency.				
	GG29	iv. Understand and prove through congruent triangles that: <ol style="list-style-type: none"> the perpendicular bisector of a chord passes through the centre equal chords are equidistant from the centre tangents drawn to a circle from a point outside the circle are equal. 				
46	GM30	i. Work out the area of any triangle.	474		Ext	<ul style="list-style-type: none"> • Extend the use of the sine and cosine functions to angles between 90° and 180°. • Use of the formula $\frac{1}{2} ab \sin C$ for an acute or obtuse angle.
	GG30	ii. Use sine and cosine formulae to solve any triangle.				
		iii. Solve problems involving sine and cosine formulae.				

Year 11 - Track 3: Shape, Space and Measurement (ii)

SMP Interact Mathematics for Malta: Higher Level

Ch	Mod	Learning Outcome:	Pg	Level	SEC	Notes
47	GG31	i. Use Pythagoras Theorem in 3D. ii. Solve simple trigonometrical problems in 3D. iii. Solve problems on bearings and angles of elevation and depression in 3D	485		Ext	E.g. to determine lengths in 3 D shapes. E.g. to find the angle between a line and a plane and the angle between two planes. • Additional exercises are necessary.

Year 11 - Track 3: Data Handling

SMP Interact Mathematics for Malta: Higher Level

Ch	Mod	Learning Outcome:	Pg	Level	SEC	Notes
15	DH13	i. Compile a cumulative frequency table and use it to draw a cumulative frequency graph.	148		Ext	
	DH13	ii. Use a cumulative frequency graph to estimate the median, the quartiles and the inter-quartile range for grouped data.				
	DH13	iii. Draw and interpret a box-and-whisker plot to illustrate or compare distributions with large data sets.				
37	DH14	i. Understand and use histograms with unequal class intervals.	380		Ext	<ul style="list-style-type: none"> Learn to label the vertical axis as frequency density and make use of the formula: $\text{frequency} = \text{length of interval} \times \text{frequency density}.$