Scheme of work for Analysis and Approaches – Standard level

Week	Date	Topic	Time	Total time
1		Standard form		
		Calculations with numbers expressed in standard form	1	
		Arithmetic sequences	1	
		Arithmetic series	1	
2		Sigma notation	1	
		Geometric sequences	1	
		Geometric series	1	
3		Sigma notation	1	
		Sum of infinity convergent geometric sequences	1	
		Applications of geometric and arithmetic patterns	1	
4		Compound interest	1	
		Annual depreciation and inflation	1	
		Real value of an investment	1	
5		Introduction to functions		
		Domain, range and graph	1	
		Function notation	1	
		Inverse function	1	
6		The graph of a function, its equation y = f(x)		
		Creating a sketch from information given or a context	1	
		Using technology to graph functions including their sums and differences.		
		Determine key features of graphs	1	
		Gradient, intercepts	1	
7		Different forms of the equation of a straight line	1	
		Parallel and perpendicular lines	1	
		Finding the point of intersection of two curves or lines using technology	1	
8		Composite functions	1	
		Identity function and inverse function	1	
		The quadratic function f(x) = ax² + bx + c, its graph, y intercept, axis of symmetry	1	
9		The form f(x) = a(x - p)(x - q)	1	
		The form f(x) = a(x - h)² + k	1	
		Finding the quadratic function from a graph		
		Solution of quadratic equations by factorisation	1	
10		Solution of quadratic equations completing the square	1	
		Solution of quadratic equations using GDC	1	
		Solution of quadratic inequalities	1	

		The quadratic formula.		
		The discriminant D = b² - 4ac and the nature of the roots	1	
		Laws of Exponents	1	
		Laws of Exponents with rational exponents		
11		Expansion and factorisation	1	
		Introduction to logarithms	1	
		Laws of logarithms	1	
12		Change of base	1	
		Solving exponential equations	1	
		Exponential function	1	
13		Logarithmic function	1	
		The reciprocal function	1	
		Rational function, Equations of vertical and horizontal asymptotes	1	
14		Solving equations both graphically and analytically	1	
		Use of technology to solve a variety of equations, including those where there is no analytical approach		
		Solving equations that relate to real-life situations	1	
		Transformations of graphs: Translations, reflections and stretch		
15		Composite transformations	2	
		Simple deductive proof, numerical and algebraic;		
		The symbols and notation for equality and identity.	1	
		Introduction to the concept of limit	1	
16		Derivative interpreted as gradient function and as rate of change	1	
		Increasing and decreasing functions	1	
		Graphical representation of f'(x)>0, f'(x) = 0, f'(x) <0	1	
17		Derivative of $f(x) = ax^n$	1	
		The derivative of functions of the form $f(x) = ax^n + bx^{n-1}$	1	
		Tangents and normals at a given point and their equations	1	
18		The derivative of e^x , ln x, x^n	1	
		The product rule	1	
		The quotient rule	1	
19		The chain rule	1	
		The second derivative	1	
		Graphical behaviour of functions, including the relationship between the graphs of f, f'and f''	1	
20		Local maximum and minimum points	1	
		Testing for maximum and minimum	1	
		The derivative of sin x, cos x, tan x, e^x , ln x, x^n	1	
21		Introduction to integration as antidifferentiation	1	

		Anti-differentiation with boundary condition to determine the constant term	1	
		Definite integral using technology	1	
22		Area of a region enclosed by a curve y = f(x) and the x-axis where f(x) > 0	1	
		Indefinite integral of xⁿ where n Îℚ, including n = -1, sin x, cos x, 1/x and e^x	1	
		The composites of any of these with the linear function ax + b	1	
23		Integration by inspection (reverse chain rule) or by substitution for expressions of the form ∫f(g(x))g'(x)dx	1	
		Integration by substitution for expressions of the form ∫f(g(x))g'(x)dx	1	
		Definite integrals including analytical approach	1	
24		Indefinite integral of sin x, cos x	1	
		Optimization	1	
		Points of inflexion with zero and non-zero gradients	1	
25		Kinematic problems involving displacement s, velocity v, acceleration a and total distance travelled.	1	
		Rates of changes - Calculus	1	
		Economics - Calculus	1	
26		Areas of region enclosed by a curve y = f(x) and the x-axis where f(x) can be positive or negative without the use of technology	1	
		Areas between curves	1	
		Concepts of population, sample, random sample, discrete and continuous data	1	
		Reliability of data sources and bias in a sampling		
27		Sampling techniques and their effectiveness	1	
		Presentation of data: Frequency distribution tables	1	
		Histograms (frequency histograms)	1	
		Measures of central tendency. (mean median and mode)		
28		Modal class	1	
		Measures of dispersion (interquartile range, standard deviation and variance)		
		Quartiles of discrete data	1	
		Effect of constant changes on the original data	1	
29		Cumulative frequency	1	
		Box and whisker diagrams		
		Interpretation of outliers	1	
		Linear correlation of bivariate data	1	
30		Scatter diagrams; line of best fit, by eye passing through the mean point	1	

		Equation of the regression line of y on x	1	
31		Pearson's product moment correlation coefficient, r	1	
		Introduction to the exploration		
32				92 hours

Year 2

		Concepts of trial, outcome, equally likely outcomes, relative frequency, sample space (U) and event		
		The probability of an event P(A) = n(A)/n(U)	1	
		The complementary events A and A'.		
		Expected number of occurrences.	1	
33		Use of Venn diagrams, tree diagrams, sample space diagrams and tables of outcomes to calculate probabilities	1	
		Combined events P(AÈB) = P(A) + P(B) - P(AÇB)		
		Mutually exclusive events P(A∩B)= 0	1	
		Conditional probability (PA|B) = p(A∩B)/P(B)		
		Independent events P(AÇB) = P(A)P(B)	1	
34		The distance between two points in three-dimensional space, and their midpoint	1	
		Volume and surface area of three-dimensional solids including right-pyramid, right cone, sphere, hemisphere, and combinations of these solids	1	
		The size of an angle between two intersecting lines or between a line and a plane.	1	
35		Using the trigonometric ratios to find the sides and angles of right-angled triangles.	1	
		The sine rule	1	
		The cosine rule	1	
36		Area of a triangle	1	
		Applications of right and non-right-angled trigonometry, including Pythagoras theorem, Angles of elevation and depression, Bearings		
		Construction of labelled diagrams from written statements	1	
		Radian measure of angles		
		Length of an arc	1	
37		Area of a sector	1	
		Definition of cos q, sin q in terms of the unit circle		
		Definition of tan θ as sin θ/ cos θ	1	
		Exact values of trigonometric ratios of 0, p/6, p/4, p/3, p/2 and their multiples	1	
38		Extension of the sine rule to the ambiguous case	1	

	SL3.6.1	The Pythagorean identity and Double angle identities for sine and cosine	1	
	SL3.6.3	The relationship between trigonometric ratios	1	
	SL3.7.1a	Graphs of the circular functions: sin and cos		
39	SL3.7.1b	Graphs of the circular functions: tan	1	
	SL3.7.2	Composite functions of the form f(x) = a sin(b(x + c)) + d	1	
	SL3.7.3	Transformations of circular functions	1	
40	SL3.7.4	Real-life contexts	1	
	SL3.8.1	Solving trigonometric equations in a finite interval, both graphically and analytically	1	
	SL3.8.2	Equations leading to quadratic equations in sin x, cos x or tan x.	1	
41	SL4.7.1	Concept of discrete random variable and their probability distributions	1	
	SL4.7.2	Expected value (mean) for discrete data		
	SL4.7.3	Applications	1	
	SL1.9.1	Pascal triangle and nCr	1	
42	SL1.9.2	Binomial theorem, positive integers indices	1	
	SL4.8.1	Binomial distribution	1	
	SL4.8.2	Mean and variance of the binomial distribution	1	
43	SL4.9.1	The normal distribution and curve	1	
	SL4.9.2	Properties of the normal distribution		
	SL4.9.3	Diagrammatic representation	1	
	SL4.9.4	Normal probability calculations	1	
44	SL4.9.5	Inverse normal calculations	1	
	SL4.12.1	Standardization of normal variables (z-values)	1	
45	SL4.12.2	Inverse normal calculations where mean and standard deviation are unknown	1	38 hours
				130 hours
		You may use 20 hours for the Exploration	20	
				150 hours

This is just a suggestion to distribute the topics from the Syllabus over the two Years.

You may find useful the links to our website to find resources for most of the topics.