

## Scheme of work for Applications and interpretations – Standard level

Week	Date	Topic	Time	Total time
1		<a href="#">Numbers in Standard form</a>	1	
		<a href="#">Calculations with numbers expressed in standard form</a>	1	
		<a href="#">Arithmetic sequences</a>	1	
2		<a href="#">Arithmetic series</a>	1	
		<a href="#">Sigma notation (arithmetic series)</a>	1	
		<a href="#">Geometric sequences</a>	1	
3		<a href="#">Geometric series</a>	1	
		<a href="#">Sigma notation (geometric series)</a>	1	
		<a href="#">Applications of geometric and arithmetic patterns</a>	1	
4		<a href="#">Compound interest</a>	1	
		<a href="#">Annual depreciation and inflation</a>	1	
		<a href="#">Real value of an investment</a>	1	
5		<a href="#">Introduction to functions</a>	1	
		<a href="#">Domain, Range and graph</a>	1	
		<a href="#">Function notation</a>	1	
6		<a href="#">Inverse function</a>	1	
		<a href="#">The graph of a function; its equation <math>y = f(x)</math></a>	1	
		<a href="#">Creating a sketch from information given</a>	1	
7		Using technology to graph functions	1	
		Determine key features of graphs	1	
		<a href="#">Gradient and y-intercept</a>	1	
8		<a href="#">Point-Gradient form of the equation of a straight line</a>	1	
		<a href="#">Gradient-intercept form of the equation of a straight line</a>	1	
		<a href="#">General form of the equation of a straight line</a>	1	
9		<a href="#">Parallel and perpendicular lines</a>	1	
		<a href="#">Modelling</a>	1	
		<a href="#">Linear models</a>	1	
10		Finding the point of intersection of two curves or lines using technology	1	
		<a href="#">Simultaneous equations using GDC. Graphically</a>	1	
		<a href="#">Simultaneous equations using GDC. Using the Equation Solver</a>	1	
11		<a href="#">Systems of three linear equations with three unknowns</a>	1	
		<a href="#">Solving problems with simultaneous equations</a>	1	
		Solving polynomial equations	1	
12		<a href="#">Approximation: decimal places and significant figures</a>	1	
		Estimation	1	
		<a href="#">Upper and lower bounds of rounded numbers</a>	1	

13	<a href="#">Percentage error</a>	1
	<a href="#">Amortizations and annuities using technology</a>	1
	<a href="#">Laws of Exponents with integer exponents</a>	1
14	<a href="#">Introduction to logarithms</a>	1
	<a href="#">Use of sine, cosine and tangent ratios to find the sides and angles of right-angled triangles.</a>	2
15	<a href="#">The sine rule</a>	1
	<a href="#">The cosine rule</a>	1
	<a href="#">Area of a triangle</a>	1
16	<a href="#">Applications of right and non-right-angled trigonometry, including Pythagoras' theorem (Bearings)</a>	1
	<a href="#">Angles of elevation and depression</a>	1
	Construction of labelled diagrams from written statements	1
17	<a href="#">Length of arc</a>	1
	<a href="#">Area of a sector</a>	1
	<a href="#">The distance between two points in three-dimensional space, and their midpoint</a>	1
18	<a href="#">Volume and surface area of three-dimensional solids including right-pyramid, right cone and combinations of these solids</a>	1
	The size of an angle between two intersecting lines or between a line and a plane	1
	<a href="#">Equations of perpendicular bisectors</a>	1
19	<a href="#">Voronoi diagrams: sites, vertices, edges, cells.</a>	1
	<a href="#">Constructing Voronoi diagrams</a>	1
	Addition of a site to an existing Voronoi diagram	1
20	Nearest neighbour interpolation	1
	Applications of the "toxic waste dump" problem	1
	<a href="#">Concepts of population, sample, random sample, discrete and continuous data</a>	1
21	Reliability of data sources and bias in sampling	1
	Interpretation of outliers	1
	<a href="#">Sampling techniques and their effectiveness</a>	1
22	<a href="#">Presentation of data (discrete and continuous): frequency distributions (tables)</a>	1
	<a href="#">Histograms</a>	1
	<a href="#">Cumulative frequency, cumulative frequency graphs</a>	1
23	<a href="#">Box and whisker diagrams</a>	1
	<a href="#">Measures of central tendency (mean, median and mode)</a>	1
	<a href="#">Estimation of mean from grouped data</a>	1
24	Modal class	1
	<a href="#">Measures of dispersion (IQR, standard deviation and variance)</a>	1
	Effect of constant changes on the original data	1

25	Quartiles of discrete data	1	92 hours
	Linear correlation of bivariate data	1	
	<a href="#">Pearson's product moment correlation coefficient, r.</a>	1	
26	<a href="#">Scatter diagrams; lines of best fit by eye, passing through the mean point</a>	1	
	<a href="#">Equation of the regression line of y on x</a>	1	
	Use of the equation of the regression line for prediction purposes	1	
27	Interpret the meaning of the parameters, a and b in a linear regression $y = ax + b$	1	
	<a href="#">Spearman's rank correlation coefficient</a>	2	
28	Awareness of the appropriateness and limitations of Pearson's product moment correlation coefficient and Spearman's rank correlation coefficient, and the effect of outliers on each	1	
	Formulation of null and alternative hypotheses.	1	
	Significance levels, p-values	1	
29	Expected and observed frequencies	1	
	<a href="#">The <math>\chi^2</math> test for independence: contingency tables, degrees of freedom, critical values</a>	2	
30	<a href="#">The <math>\chi^2</math> limitations</a>	1	
	<a href="#">The <math>\chi^2</math> goodness of fit test</a>	1	
	<a href="#">The t-test</a>	1	
31	Use of p-value to compare the means of two populations	1	
	Using one-tailed and two-tailed tests	1	

## Year 2

31	<a href="#">Quadratic models</a>	1	92 hours
	<a href="#">Exponential growth, and decay models</a>	1	
	<a href="#">Direct/inverse variation</a>	1	
32	<a href="#">Cubic models</a>	1	
	<a href="#">Sinusoidal models</a>	1	
	<a href="#">Concepts of trial, outcome, equally likely outcomes, relative frequency, sample space (U) and event</a>	1	
33	The probability of an event A	1	
	The complementary events A and A'(not A)	1	
	Expected number of occurrences	1	
34	<a href="#">Use of Venn diagrams, tree diagrams, sample space diagrams and tables of outcomes to calculate probabilities</a>	1	
	<a href="#">Combined events: <math>P(A \cup B) = P(A) + P(B) - P(A \cap B)</math></a>	1	
	Mutually exclusive events: $P(A \cap B) = 0$	1	
35	<a href="#">Conditional probability <math>P(A B) = P(A \cap B) / P(B)</math></a>	1	
	<a href="#">Independent events <math>P(A \cap B) = P(A)P(B)</math></a>	1	
	<a href="#">Concept of discrete random variables and their probability distribution</a>	1	

36	<a href="#">Expected value (mean) E(X) for discrete data</a>	1	38 hours	
	Applications	1		
	<a href="#">Binomial distribution</a>	1		
37	<a href="#">Mean and variance of the binomial distribution</a>	1		
	<a href="#">The normal distribution and curve</a>	1		
	Properties of the normal distribution	1		
38	<a href="#">Normal probability calculations</a>	1		
	<a href="#">Inverse normal calculations</a>	1		
	<a href="#">Introduction to the concept of a limit</a>	1		
39	<a href="#">Derivative interpreted as gradient function and as rate of change</a>	1		
	<a href="#">Increasing and decreasing functions</a>	1		
	Graphical interpretation of $f'(x) > 0$ ; $f'(x) = 0$ ; $f'(x) < 0$	1		
40	<a href="#">Derivative of <math>f(x) = ax^n</math></a>	1		
	<a href="#">The derivative of functions of the form <math>f(x) = ax^n + bx^{n-1}</math></a>	1		
	<a href="#">Tangents and normals at a given point, and their equations</a>	1		
41	<a href="#">Local maximum and minimum points</a>	1		
	<a href="#">Optimisation problems in context</a>	1		
	<a href="#">Introduction to integration as antidifferentiation</a>	1		
42	<a href="#">Anti-differentiation with boundary condition to determine the constant term</a>	1		
	<a href="#">Definite integral using technology</a>	1		
	<a href="#">Area of a region enclosed by a curve <math>y = f(x)</math> and the x-axis where <math>f(x) &gt; 0</math></a>	1		
43	Values of x where the gradient of a curve is zero	1		
	Approximating areas using the trapezoidal rule	1		
You may use 20 hours for the Exploration		20		130 hours

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.