



Year 12 Pure Mathematics Curriculum Overview

Title	
1	Algebra and functions
	Algebraic expressions – basic algebraic manipulation, indices and surds
	Quadratic functions – factorising, solving, graphs and the discriminants
	Equations – quadratic/linear simultaneous
	Inequalities – linear and quadratic (including graphical solutions)
	Graphs – cubic, quartic and reciprocal
	Transformations – transforming graphs – $f(x)$ notation
2	Coordinate geometry in the (x, y) plane
	Straight-line graphs, parallel/perpendicular, length and area problems
	Circles – equation of a circle, geometric problems on a grid
3	Further algebra
	Algebraic division, factor theorem and proof The binomial expansion
4	Trigonometry
	Trigonometric ratios and graphs Trigonometric identities and equations
5	Vectors (2D)
	Definitions, magnitude/direction, addition and scalar multiplication Position vectors, distance between two points, geometric problems
6	Differentiation
	Definition, differentiating polynomials, second derivatives Gradients, tangents, normals, maxima and minima
7	Integration
	Definition as opposite of differentiation, indefinite integrals of x^n Definite integrals and areas under curves
8	Exponentials and logarithms: Exponential functions and natural logarithms



Year 12 Statistics and Mechanics Curriculum Overview

Statistics	
1	<p>Statistical sampling</p> <p>Introduction to sampling terminology; Advantages and disadvantages of sampling</p> <p>Understand and use sampling techniques; Compare sampling techniques in context</p>
2	<p>Data presentation and interpretation</p> <p>Calculation and interpretation of measures of location; Calculation and interpretation of measures of variation; Understand and use coding</p> <p>Interpret diagrams for single-variable data; Interpret scatter diagrams and regression lines; Recognise and interpret outliers; Draw simple conclusions from statistical problems</p>
3	<p>Probability: Mutually exclusive events; Independent events</p>
4	<p>Statistical distributions: Use discrete distributions to model real-world situations; Identify the discrete uniform distribution; Calculate probabilities using the binomial distribution (calculator use expected)</p>
5	<p>Statistical hypothesis testing</p> <p>Language of hypothesis testing; Significance levels</p> <p>Carry out hypothesis tests involving the binomial distribution</p>
Mechanics	
6	<p>Quantities and units in mechanics</p> <p>Introduction to mathematical modelling and standard S.I. units of length, time and mass</p> <p>Definitions of force, velocity, speed, acceleration and weight and displacement; Vector and scalar quantities</p>
7	<p>Kinematics 1 (constant acceleration)</p> <p>Graphical representation of velocity, acceleration and displacement</p> <p>Motion in a straight line under constant acceleration; <i>suvat</i> formulae for constant acceleration; Vertical motion under gravity</p>
8	<p>Forces & Newton's laws</p> <p>Newton's first law, force diagrams, equilibrium, introduction to \mathbf{i}, \mathbf{j} system</p> <p>Newton's second law, '$F = ma$', connected particles (no resolving forces or use of $F = \mu R$); Newton's third law: equilibrium, problems involving smooth pulleys</p>
9	<p>Kinematics 2 (variable acceleration)</p> <p>Variable force; Calculus to determine rates of change for kinematics</p> <p>Use of integration for kinematics problems</p>