

A Level Pure Topics	A Level Year 1	A Level Year 2	GCSE/ iGCSE
<b>Algebra</b>			
Expanding brackets and simplifying expressions			GCSE
Factorising (4 main types – common, difference of 2 squares, product sum and AC method)			GCSE
Simultaneous Equations (linear and quadratic)			GCSE
Completing The Square			GCSE
Solving and Forming Quadratics			GCSE
Surds			GCSE
Linear and Quadratic Modelling			
Solving Inequalities (linear and quadratic)			GCSE
Solving Inequalities (rational)			
Indices			GCSE
Algebraic Fractions			GCSE
Discriminant (including hidden discriminant)			
Binomial Expansion (integers powers)			
Binomial Expansion (fractional and negative powers)			
Polynomial Division			
Factor theorem			
Remainder Theorem			
Partial Fractions			
<b>Geometry</b>			
Volume and surface area of 3D shapes (assumed knowledge)			GCSE
Straight Line Graphs (including parallel and perpendicular lines)			GCSE
Tangent to a circle			GCSE
Circles (equation of a circle)			
<b>Trigonometry</b>			
Bearings			GCSE
Radians			
Arc Lengths And Areas Of Sectors			
Given The Value Of One Trig Function, Find Another			
Sine/Cosine Rule			GCSE
Identities and solving with $\sin^2 x + \cos^2 x = 1$ and $\tan x = \frac{\sin x}{\cos x}$			
Pythagoras, SOHCAHTOA and 3D trig (assumed knowledge)			GCSE
Trig graphs (sin, cos and tan)			
Identities and solving with $1 + \tan^2 x = \sec^2 x$ and $1 + \cot^2 x = \operatorname{cosec}^2 x$			
Identities and solving with reciprocal functions: $\sec x = \frac{1}{\cos x}$ , $\operatorname{cosec} x = \frac{1}{\sin x}$ , $\cot x = \frac{1}{\tan x}$			
Identities and solving with double angle formulae			
Identities and solving with addition angle formulae			
Identities and solving with $a \sin x \pm b \cos x$ or $a \cos x \pm b \sin x$ forms			
Small Angle Approximations			
Inverse Trig – finding values			
Trig graphs – reciprocal and inverse trig			
Trigonometric Models			
<b>Exponentials and Logs</b>			
Simplifying Expressions			
Solving Logarithmic Equations			
Solving Natural Logarithmic Equations			
Solving exponential equations			
Linear transformations			
Exponential Models			
<b>Proof</b>			
Counter Example			
Deduction			
Exhaustion			
Contradiction			
<b>Differentiation</b>			
$y = x^n$ differentiation technique			iGCSE only
Understanding differentiation as a connected rates of change and small increments			
Differentiation by 1 <sup>st</sup> principles – $x^n$ types			
Differentiation by 1 <sup>st</sup> principles – trig functions			
Finding gradients			iGCSE only
Stationary points (max/min)			iGCSE only
Points of Inflection			
Increasing/Decreasing			
Convex/Concave			
Tangents and Normals (finding equations + other applications)			
$f \leftrightarrow f' \leftrightarrow f''$ graphs			
Optimisation			iGCSE only

Differentiating $x$ in terms of $y$ and getting answer in terms of $x$			
Composite functions differentiation techniques – chain rule ( $(f(x))^n, \ln f(x), e^{f(x)}, a^{f(x)}, \sin f(x)$ etc)			
Product and Quotient Rule			
Implicit Differentiation			
Rates of Change/Related Rates			
<b>Integration</b>			
$\int x^n$ Integration Technique			
Finding area under a curve			
Composite functions integration techniques ( $(f(x))^n, \frac{1}{f(x)}, e^{f(x)}, \sin f(x)$ etc)			
Integration by Parts			
Integration by Substitution			
Trapezium Rule			
Riemann Sums			
Differential Equations			
<b>Sequences and Series</b>			
Arithmetic Series			
Geometric Series			
Sigma Notation			
Recursive Sequences			
<b>Functions</b>			
Types of functions (one to one, many to one)			
Basics (notation, composite etc)			GCSE
Finding inverses and knowing when they exist			GCSE
Modulus (solving equalities and inequalities)			
<b>Graphing</b>			
Basic graphs (linear, quadratic, cubic, rational exponential, log and trig)			GCSE
Basic graphs (quartic and root)			
More advanced graphs (modulus, reciprocal trig and inverse trig)			
Graphing a modulus graph without being given the equation			
Transformations			GCSE
Finding points of intersection and intercepts			GCSE
Finding a polynomial equation when given a graph			iGCSE
Solving graphically			GCSE
Domain and Range			
<b>Numerical Methods</b>			
Iteration			GCSE
Newton Raphson			
<b>Parametric Equations</b>			
Sketching			
Domain & range			
Finding Points of intersection			
Differentiation			
Integration			
Finding Areas			
Modelling			
<b>Vectors</b>			
2D Vectors			GCSE
3D Vectors			
Geometric Problem Solving Types			GCSE

A Level Mechanics Topics	A Level Year 1	A Level Year 2	GCSE
<b>Kinematics</b>			
Displacement, velocity and time graphs			
SUVAT – constant acceleration			
Differentiating and Integrating to get displacement, velocity, acceleration – non constant accel			
Projectiles			
<b>Basic Forces</b>			
Basic horizontal and vertical forces - finding the resultant and magnitude			
Basic diagonal forces resolving - finding the resultant, magnitude and angles			
Using $f = ma$ to solve basic problems such as boxes on tables etc			
Finding missing angles and forces in force diagrams			
<b>Connected Particles</b>			
Lifts			
Cars and Trailers			
Pulleys - Vertical			
Pulleys – Inclined planes			
<b>Moments</b>			
Flat plane – vertical forces			
Flat plane – diagonal forces			
Inclined plane – ladders			
<b>Vectors</b>			
Basic resolving on forces given in vector form - resultant and magnitude and finding angles			
SUVAT			
Differentiating and Integrating to get displacement, velocity, acceleration – non constant accel			

A Level Statistics Topics	A Level Year 1	A Level Year 2	GCSE
<b>Data</b>			
Sampling			
Large data set (memorised set of facts – doesn't involve maths knowledge)			
Mean calculations			GCSE
Standard deviation calculations			
Quartile Calculations – without Interpolation			GCSE
Quartile Calculations – with Interpolation			
Outliers			
Coding			
Box Plots			GCSE
Cumulative Frequency			GCSE
Histograms			GCSE
Comparing Data			GCSE
<b>Regression and Correlation</b>			
Definition of correlation			GCSE
Calculating the correlation coefficient $r$ and interpreting it			
Calculating the line of best fit/least squares regression line and interpreting the slope and intercept			
Using the line of best fit to make predictions			
Exponential Models			
<b>Probability</b>			
Set Notation			iGCSE only
Mutually exclusive and Independent Events			
Conditional Events			
Venn Diagrams			GCSE
Tree Diagrams			GCSE
Two Way Tables			GCSE
<b>Distributions</b>			
Dealing with Discrete Random Variables – Probability Distributions			
Binomial Distribution			
Normal Distribution			
Normal Approximation to Binomial (including Continuity Correction)			
<b>Hypothesis Testing</b>			
Binomial Distribution – performing the test, finding critical values and p values			
Normal Distribution – performing the test, finding critical values and p values			
Correlation – performing the test, finding critical values and p values			