Maths

Precision in Learning, Excellence in Results

Year 12 (AS Level) Course Plan

Pure Maths Course Content

Chapter No	Topic	Subtopics
1	**Algebraic Expressions**	1.1 Simplifying algebraic expressions
		1.2 Indices
		1.3 Surds and rationalising denominators
2	**Quadratics**	2.1 Solving quadratic equations
		2.2 Quadratic functions (maximum / minimum)
		2.3 The discriminant
		2.4 Modelling with quadratics
3	**Equations and Inequalities**	3.1 Solving simultaneous equations
		3.2 Solving inequalities (linear/quadratic)
		3.3 Inequalities on graphs
		3.4 Regions
4	**Graphs and Transformations**	4.1 Graphs of polynomial functions
		4.2 Other algebraic graphs
		4.3 Transformation of graphs
5	**Straight Line Graphs**	5.1 Equations of straight lines
		5.2 Modelling with straight lines

6	**Circles**	6.1 Equations of circles
		6.2 Straight lines and circles
7	**Algebraic Methods**	7.1 Algebraic fractions
		7.2 Dividing polynomials
		7.3 Factor theorem
		7.4 Mathematical proof
8	**Binomial Expansion**	8.1 Binomial expansion (n positive integers)
		8.2 Binomial problems
		8.3 Binomial estimation
9	**Trigonometry**	9.1 Trig ratios and graphs of trig functions
		9.2 Trig rules (sine/cosine) and area formula
		9.3 Trig ratios in four quadrants
		9.4 Trig identities
		9.5 Solving trig equations
10	**Differentiation**	10.1 Introduction to differentiation (first principle)
		10.2 Differentiating x^n and basic rules
		10.3 Gradient function
		10.4 Tangent and normal
		10.5 Increasing and decreasing functions
		10.6 Second-order derivative and stationary points
		10.7 Sketching graphs
		10.8 Modelling with differentiation
11	**Integration**	11.1 Integrating x^n and basic rules
		11.2 Indefinite integrals
		11.3 Definite integrals
		11.4 Area under curves
12	**Exponentials and Logarithms**	12.1 Exponential functions
		12.2 Exponential modelling
		12.3 Laws of logarithms / natural logarithms

		12.4 Solving equations using logarithms
		12.5 Logarithms and non-linear data

Statistics Maths Course

Chapter No	Topic	Subtopics
1	**Data Collection**	1.1 Sampling
		1.2 Large data set
2	**Measures of Location & Spread**	2.1 Measure of central tendency
		2.2 Measures of spread
		2.3 Variance and standard deviation
		2.4 Coding
3	**Representing Data**	3.1 Statistical graphs
		3.2 Outliers
		3.3 Comparing data sets
4	**Correlation**	4.1 Correlation and linear regression
5	**Probability**	5.1 Calculating probability
		5.2 Independent and mutually exclusive events
6	**Statistical Distribution**	6.1 Probability distribution
		6.2 Binomial distribution
7	**Hypothesis Tests**	7.1 Introduction to hypothesis testing
		7.2 Finding critical values
		7.3 One-tailed and two-tailed tests

Mechanics Maths Course

Chapter No	Topic	Subtopics
1	**Modelling in Mechanics**	1.1 Introduction to modelling
2	**Constant Acceleration**	2.1 Distance-time and velocity-time graphs
		2.2 Constant acceleration formula

		2.3 Vertical motion under gravity
3	**Forces and Motion**	3.1 Force diagrams
		3.2 Forces as vectors
		3.3 Forces and acceleration
		3.4 Connected particles and pulleys
4	**Variable Acceleration**	4.1 Displacement, velocity and acceleration
		4.2 Using differentiation and integration