



Year 12 Syllabus in a nutshell

AS Level MATHS





Year 12 Syllabus in a nutshell – AS Level Maths

You are making excellent progress through the AS course and therefore make use of the Summer break to consolidate your understanding of the course so far. Remember to make use of your textbooks and the Integral Website for additional questions to support your consolidation.

Pure

Topic	A Level Reference – taken directly from specification	Summary
Algebraic Expressions	1a. Algebraic expressions: basic algebraic manipulation, indices and surds (2.1) (2.2)	Index laws, algebraic manipulation to include expanding brackets and factorising expressions and manipulation of surds (including rationalising the denominator)
Quadratics	1b. Quadratic functions: factorising, solving, graphs and discriminants (2.3)	Solving quadratic equations, complete the square of quadratic expressions, draw sketches of quadratic functions and make use of the discriminant to identify the number of roots of a quadratic equation. Modelling problems involving quadratics
Equations and Inequalities	1c. Equations: quadratic/linear simultaneous (2.4) 1d. Inequalities: linear and quadratic (including graphical solutions) (2.5)	Solve linear and quadratic simultaneous equations. Solve linear and quadratic inequalities and solve inequality problems, including those on a graph.
Graphs and Transformations	1e. Graphs: cubic, quartic and reciprocal (2.7) 1f. Transformations: transforming graphs (2.9), $f(x)$ notation (2.8)	Draw and interpret cubic, quartic, reciprocal graphs. Find points of intersection and transform graphs.
Circles	2b. Circles: equation of a circle, geometric problems on a grid (3.2)	Know how to find the equation of a circle and use this knowledge to solve further geometrical problems
Trigonometric Ratios	4a. Trigonometric ratios and graphs (5.1) (5.3)	Understand the definition of the trigonometric ratios and their accompanied graphs
Trigonometric Equations and Identities	4b. Trigonometric identities and equations (5.5) (5.7)	Know and use the trigonometric identities to proof identities and solve equations
Vectors	5a. Definitions, magnitude/direction, addition and scalar multiplication (10.1) (10.2) (10.3) 5b. Position vectors, distance between two points, geometric problems (10.4) (10.5)	Manipulate vectors and understand the uses of vectors in a variety of problem solving settings, including being able to find the distance between two points and other geometrical problems.
Straight Line Graphs	2a. Straight-line graphs, parallel/perpendicular, length and area problems (3.1) (2.7)	Find the equation of a straight line, find parallel and perpendicular lines and use these ideas to solve further geometrical problems



Applied

Topic	A Level Reference – taken directly from specification	Summary
Data Collection	1a. Introduction to sampling terminology; Advantages and disadvantages of sampling (1.1) 1b. Understand and use sampling techniques; Compare sampling techniques in context (1.1)	Know different methods of sampling with their associated advantages and disadvantages. Be able to identify appropriate sampling techniques in context
Measures of Location and Spread	2a. Calculation and interpretation of measures of location; Calculation and interpretation of measures of variation; Understand and use coding (2.3) (2.4)	Calculate and interpret measures of location and spread. Know how to use coding and how this affects measures of location and spread.
Representation of Data	2b. Interpret diagrams for single-variable data; Interpret scatter diagrams and regression lines; Recognise and interpret outliers; Draw simple conclusions from statistical problems (2.1) (2.2) (2.4)	Interpret and draw diagrams for single-variable data and bivariate data (Scatter diagrams and regression lines). You will not be required to find the regression line by hand but you may be required to use your calculator to find this. Identify and interpret outliers and draw basic conclusions from statistical problems.
Probability	Mutually exclusive events; Independent events (3.1)	Calculate probabilities and know the definitions of mutually exclusive events and independent events. Calculate related probabilities making use of these ideas.
Correlation	2b. Interpret diagrams for single-variable data; Interpret scatter diagrams and regression lines; Recognise and interpret outliers; Draw simple conclusions from statistical problems (2.1) (2.2) (2.4)	Identify the correlation and interpret the regression line (You will not be required to find the regression line by hand but you may be required to use your calculator to find this)
Statistical Distributions	Year 1 Material: Use discrete distributions to model real-world situations; Identify the discrete uniform distribution; Calculate probabilities using the binomial distribution (calculator use expected) (4.1)	Use discrete distributions to model real-world situations, including the use of the discrete uniform distribution. Calculate probabilities using the binomial distribution.
Hypothesis Testing	Year 1 Material: 5a. Language of hypothesis testing; Significance levels (5.1) 5b. Carry out hypothesis tests involving the binomial distribution (5.2)	Know how to compute a hypothesis test, use of significance levels and knowing the difference between a one/two tail test. Carry out hypothesis tests involving binomial distribution.
Modelling in Mechanics	6a. Introduction to mathematical modelling and standard S.I units of length, time and mass (6.1) 6b. Definitions of force, velocity, speed, acceleration, weight and displacement; Vector and scalar quantities (6.1)	Understand all the basic mechanic modelling, including knowledge of the SI units and the definitions of force, velocity, speed, acceleration, weight and displacement. Know the difference between a vector and scalar quantity
Constant Acceleration	7a. Graphical representation of velocity, acceleration and displacement (7.1) (7.2)	Use graphical representation of velocity, acceleration and displacement and use the straight line graphs to deduce the equations for constant



	7b. Motion in a straight line under constant acceleration; <i>suvat</i> formulae for constant acceleration; Vertical motion under gravity (7.3) (8.3)	acceleration. Apply <i>suvat</i> equations to constant acceleration problems, including vertical motion under gravity
Forces and Motion	8a. Newton's first law, force diagrams, equilibrium, introduction to i, j system of vectors (8.1) 8b. 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 (8.2) (8.4)	Know and use Newton's First, Second and Third Laws of Motion. This includes connected particle problems.