TAUNTON SCHOOL

Year 12 Syllabus in a nutshell

A Level MATHS

Year 12 Syllabus in a nutshell – A Level Maths

The AS course has been completed and therefore following the summer holiday there will be an assessment covering all the topics from the year 1 books for BOTH Pure and Applied. I have given details of the AS course in the A Level references – look for "Year 1 Material" . 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	Year 1 Material: 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	Year 1 Material: 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	Year 1 Material: 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	Year 1 Material: 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	Year 1 Material: 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	Year 1 Material: 4a. Trigonometric ratios and graphs (5.1) (5.3)	Understand the definition of the trigonometric ratios and their accompanied graphs
Trigonometric Equations and Identities	Year 1 Material: 4b. Trigonometric identities and equations (5.5) (5.7)	Know and use the trigonometric identities to proof identities and solve equations
Vectors	Year 1 Material: 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.
Exponentials and Logarithms	Year 1 Material:	Knowledge and understanding of exponential functions and natural logarithms, as well as their

	Exponential functions and natural logarithms (6.1) (6.2) (6.3) (6.4) (6.5) (6.6) (6.7)	graphs. Be able to manipulate expressions using exponents and logarithms
Differentiation	Year 1 Material: 6a. Definition, differentiating polynomials, second derivatives (7.1) (7.2) 6b. Gradients, tangents, normals, maxima and minima (7.3)	Understand differentiation from first principles and be able to deduce the results from scratch. Know the basic rules of differentiating polynomial functions and apply this to finding gradients, tangents and normal to curves. This includes being able to solve max/min problems in problem solving
Integration	Year 1 Material: 7a. Definition as opposite of differentiation, indefinite integrals of x^n (8.1) (8.2) 7b. Definite integrals and areas under curves (8.3)	Understand integration as the reverse of integration. Calculate indefinite and definite integrals and understand how to use integration to find the area under a curve.
Binomial Expansion	Year 1 Material: 3b. The binomial expansion (4.1)	Expand brackets in the form $(a + b)^n$, where n is a positive integer
Straight Line Graphs	Year 1 Material: 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
Algebraic Methods	Year 2 Material: 3a. Algebraic division, factor theorem and proof (2.6) (1.1) Examples including proof by deduction and proof by contradiction (1.1) 2a. Simplifying algebraic fractions (2.6) 2b. Partial fractions (2.10)	Manipulate algebraic fractions including division and use of the factor theorem to factorise polynomials. Use proof by deduction and proof by contradiction to prove mathematical statements. Find partial fractions.
Sequences and Series	Year 2 Material: 4a. Arithmetic and geometric progressions (proofs of 'sum formulae') (4.4) (4.5) (4.6) 4b. Sigma notation (4.3) 4c. Recurrence and iterations (4.2) (4.6)	Know and identify arithmetic and geometric sequences. Be able to prove the sum formula for both sum of arithmetic and sum of geometric series. Use sigma notation and interpret recurrence relationships being able to identify terms of a sequence.
Functions and Graphs	Year 2 Material: 3a. Modulus function (2.7) 3b. Composite and inverse functions (2.8) 3c. Transformations (2.9) 3d. Modelling with functions (2.11)	Understand and interpret modulus functions and their related graphs. Define functions and understand and know the related language. Know how to find a composite and inverse function. Use transformations and understand how functions can be used to model different situations

Applied

Topic	A Level Reference – taken directly from specification	Summary
Data Collection	Year 1 Material: 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	Year 1 Material: 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	Year 1 Material: 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	Year 1 Material: 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.
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.
Correlation	Year 1 Material: 2b. Interpret diagrams for single-variable data; Interpret scatter diagrams	Identify the correlation and be able to calculate the correlation coefficient. Use hypothesis test for correlation coefficients.

	and regression lines; Recognise and interpret outliers; Draw simple conclusions from statistical problems (2.1) (2.2) (2.4) Year 2 Material: 1a. Change of variable (2.2) 1b. Correlation coefficients; Statistical hypothesis testing for correlation coefficients (5.1)	In exams you will not be required to calculate the product moment correlation coefficient from scratch, but you will be required to evaluate it using your calculator. You will then need to interpret the value in the context of the problem.
Modelling in Mechanics	Year 1 Material: 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	Year 1 Material: 7a. Graphical representation of velocity, acceleration and displacement (7.1) (7.2) 7b. Motion in a straight line under constant acceleration; *suvat* formulae for constant acceleration; Vertical motion under gravity (7.3) (8.3)	Use graphical representation of velocity, acceleration and displacement and use the straight line graphs to deduce the equations for constant acceleration. Apply suvat equations to constant acceleration problems, including vertical motion under gravity
Forces and Motion	Year 1 Material: 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.
Variable Acceleration	Year 1 Material: 9a. Variable force; Calculus to determine rates of change for kinematics (differentiation) (7.4) 9b. Use of integration for kinematics problems i.e. $r = \int v \, \mathrm{d}t$, $v = \int a \, \mathrm{d}t$ (7.4)	Use of differentiation and integration to solve problems involving variable acceleration.