

YEAR 12	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Content	<p><b>PURE Algebra and Functions</b> Algebraic expressions Quadratic functions Equations and Inequalities Graphs and transformations</p> <p><b>PURE Coordinate geometry</b> Straight line graphs Circles</p> <p><b>PURE Further algebra</b> Algebraic division Factor theorem Proofs</p>	<p><b>PURE Further algebra</b> Binomial</p> <p><b>PURE Trigonometry</b> Trig ratios and graphs Trig identities and equations</p> <p><b>PURE Vectors</b> 2D vectors magnitude and direction Geometric problems</p> <p><b>PURE Calculus</b> Differentiation</p>	<p><b>PURE Calculus</b> Integration</p> <p><b>PURE Exponentials and logarithms</b> Exponential functions Logarithms Non linear data</p> <p><b>STATISTICS Statistical Sampling</b> Data collection Measure of location and spread</p> <p><b>STATISTICS Data representation and interpretation</b> Representations of data</p> <p><b>STATISTICS Data representation and interpretation</b> Correlation</p> <p><b>MECHANICS Constant Acceleration (Kinematics)</b> Modelling Vectors</p>	<p><b>STATISTICS Probability</b> Calculating probabilities Mutually exclusive and Independent events Probability distribution Binomial distributions Cumulative probabilities</p> <p><b>STATISTICS Hypothesis Testing</b> Critical values One tailed tests Two tailed tests</p> <p><b>MECHANICS Constant Acceleration (Kinematics)</b> SUVAT Displacement time graphs Velocity time graphs Gravity</p> <p><b>MECHANICS</b></p>	<p><b>PURE Algebra and Functions</b> Proofs Partial Fractions</p> <p><b>PURE Algebra and Functions</b> Modulus function Mappings Composite functions Inverse functions</p>	<p><b>PURE Sequences and Series</b> Arithmetic Geometric Sum to infinity Recurrence</p> <p><b>PURE Algebra and Functions</b> The binomial expansion</p> <p><b>PURE Trigonometry</b> Radians Area of sectors and segments Small angle approximation Trig functions Trig identities Inverse trig functions</p>

				<b>Forces &amp; Newton's laws</b> Newton's first law Newton's second law Pulleys		
Skills	AO1: Use and apply standard techniques. AO2: Reason, interpret and communicate mathematically AO3: Solve problems within mathematics and in other contexts	AO1: Use and apply standard techniques. AO2: Reason, interpret and communicate mathematically AO3: Solve problems within mathematics and in other contexts	AO1: Use and apply standard techniques. AO2: Reason, interpret and communicate mathematically AO3: Solve problems within mathematics and in other contexts	AO1: Use and apply standard techniques. AO2: Reason, interpret and communicate mathematically AO3: Solve problems within mathematics and in other contexts	AO1: Use and apply standard techniques. AO2: Reason, interpret and communicate mathematically AO3: Solve problems within mathematics and in other contexts	AO1: Use and apply standard techniques. AO2: Reason, interpret and communicate mathematically AO3: Solve problems within mathematics and in other contexts
Topic List	<a href="#">Algebraic expressions</a> <a href="#">Completing the square</a> <a href="#">Discriminant</a> <a href="#">Inequalities</a> <a href="#">Graphs and Transformations</a> <a href="#">Equation of a straight line</a> <a href="#">Equation of a circle</a> <a href="#">Factor theorem</a> <a href="#">Proof</a>	<a href="#">Sine-Cosine- Area</a> <a href="#">Binomial Expansion</a> <a href="#">Solve trig Equations</a> <a href="#">Vectors</a> <a href="#">First Principles</a> <a href="#">Differentiation</a>	<a href="#">Integration</a> <a href="#">Exp and Logs</a> <a href="#">Sampling</a> <a href="#">Interpolation and standard deviation</a> <a href="#">Box plots</a> <a href="#">Histograms</a> <a href="#">Correlation and Regression</a> <a href="#">Vectors - Mechanics</a>	<a href="#">Probability</a> <a href="#">Binomial-hypothesis-testing</a> <a href="#">Discrete Random Variables</a> <a href="#">Velocity- time graphs</a> <a href="#">SUVAT</a> <a href="#">F = ma</a> <a href="#">Variable acceleration</a>	<a href="#">Proof by Contradiction</a> <a href="#">Partial Fractions</a> <a href="#">Functions</a> <a href="#">Graph</a> <a href="#">Transformations</a>	<a href="#">Arithmetic Sequence</a> <a href="#">Geometric sequence</a> <a href="#">Binomial Expansion</a> <a href="#">recurrence notations</a> <a href="#">Radians</a> <a href="#">Small angle approximations</a> <a href="#">Sec Cosec and Cot</a> <a href="#">Trig Identities</a>

Assessment	Baseline Test Topic Tests Consolidation exam questions at the end of every lesson	Topic Tests Consolidation exam questions at the end of every lesson	Topic Tests Consolidation exam questions at the end of every lesson	Topic Tests Consolidation exam questions at the end of every lesson	End of Year Mocks Topic Tests Consolidation exam questions at the end of every lesson	Topic Tests Consolidation exam questions at the end of every lesson
Literacy/numeracy/SMSC/Character	<p><b>Further Reading</b></p> <ul style="list-style-type: none"> <li>● <i>The Code Book</i> – Simon Singh</li> <li>● <i>The Music of the Primes</i> – Marcus du Sautoy</li> <li>● <i>Thinking About Mathematics</i> – Stewart Shapiro</li> <li>● <i>Chaos, Making a New Science</i> – James Gleick</li> <li>● <i>Alex's Adventures in Numberland: Dispatches from the Wonderful World of Numbers</i> – Alex Bellos</li> <li>● <i>It Must be Beautiful: Great Equations of Modern Science</i> – edited by Graham Farmelo</li> <li>● <i>The Problems of Mathematics, Nature's Numbers, From Here to Infinity, Game, Set and Math and The Magical Maze</i> – Ian Stewart</li> <li>● <i>What is Mathematics?</i> – Courant and Robbins</li> <li>● <i>Mathematics: The Golden Age</i> – Devlin</li> </ul>		<p><b>Key Words</b></p> <p><u>PURE Algebra and Functions</u> Expression, function, constant, variable, term, unknown, coefficient, index, linear, identity, simultaneous, elimination, substitution, factorise, completing the square, intersection, change the subject, cross-multiply, power, exponent, base, rational, irrational, reciprocal, root, standard form, surd, rationalise, exact, manipulate, sketch, plot, quadratic, maximum, minimum, turning point, transformation, translation, polynomial, discriminant, real roots, repeated roots, factor theorem, quotient, intercepts, inequality, asymptote</p> <p><u>PURE Coordinate geometry in the (x, y) plane</u> Equation, bisect, centre, chord, circle, circumcircle, coefficient, constant, diameter, gradient, hypotenuse, intercept, isosceles, linear, midpoint, parallel, perpendicular, proportion, Pythagoras, radius, right angle, segment, semicircle, simultaneous, tangent.</p> <p><u>PURE Further algebra</u> Binomial, coefficient, probability, proof, assumptions, deduction, exhaustion, disproof, counter-example, polynomials, factorisation, quadratic, cubic, quartic, conjecture, prediction, rational number, implies, necessary, sufficient, converse, fully factorise, factor, expand, therefore, conclusion.</p> <p><u>PURE Trigonometry</u> Sine, cosine, tangent, interval, period, amplitude, function, inverse, angle of elevation, angle of depression, bearing, degree, identity, special angles, unit circle, symmetry, hypotenuse, opposite, adjacent, intercept</p> <p><u>PURE Vectors</u> Vector, scalar, magnitude, direction, component, parallel, perpendicular, modulus,</p>			

	<ul style="list-style-type: none"> <li>• <i>A Mathematician's Apology</i> – Hardy</li> <li>• <i>Makers of Mathematics</i> – Hollingdale</li> </ul>	<p>dimension, ratio, collinear, scalar product, position vectors</p> <p><u>PURE Calculus</u> Differentiation, derivative, first principles, rate of change, rational, constant, tangent, normal, increasing, decreasing, stationary point, maximum, minimum, integer, calculus, function, parallel, perpendicular. Calculus, differentiate, integrate, reverse, indefinite, definite, constant, evaluate, intersection.</p> <p><u>PURE Exponentials and logarithms</u> Exponential, exponent, power, logarithm, base, initial, rate of change, compound interest</p> <p><u>STATISTICS Statistical Sampling</u> Population, census, sample, sampling unit, sampling frame, simple random sampling, stratified, systematic, quota, opportunity (convenience) sampling.</p> <p><u>STATISTICS Data representation and interpretation</u> Histogram, box plot, probability density function, cumulative distribution function, continuous random variable, scatter diagram, linear regression, explanatory (independent) variables, response (dependent) variables interpolation, extrapolation, product moment correlation coefficient (PMCC), mean, median, mode, variance, standard deviation, range, interquartile range, interpercentile range, outlier, skewness, symmetrical, positive skew, negative skew.</p> <p><u>STATISTICS Probability</u> Sample space, exclusive event, complementary event, discrete random variable, continuous random variable, mathematical modelling, independent, mutually exclusive, Venn diagram, tree diagram. Binomial, probability, discrete distribution, discrete random variable, uniform, cumulative probabilities</p> <p><u>STATISTICS Hypothesis Testing</u> Hypotheses, significance level, one-tailed test, two-tailed test, test statistic, null hypothesis, alternative hypothesis, critical value, critical region, acceptance region, p-value, binomial model, accept, reject, sample, inference.</p> <p><u>MECHANICS Constant Acceleration (Kinematics)</u> <u>Modelling</u> Modelling, smooth, rough, light, inelastic, inextensible, particle, rigid body, mass,</p>
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<p>Enrichment opportunities and futures</p>	<p><b>Further Study</b>  Mathematics Degree  Related Degree Subjects</p> <p>More information:  <a href="https://www.mathscareers.org.uk/degree-courses-a-level-mathematics/">https://www.mathscareers.org.uk/degree-courses-a-level-mathematics/</a></p>	<p><b>Career Paths</b>  STEM subjects  Insurance and Risk  Data Science  Computing  Natural and Life Sciences  Business and Operations  Humanities  Banking/Finance  Business  Operations</p>	<p><b>Extracurricular at Haydon</b>  Webinars  Maths Works Maths Modelling  Challenge MC3  Shared podcasts  Online uni events</p>