

## Year 13 A-Level Maths Overview 2023-24

	Term 1	Term 2	Term 3
<b>Unit Title</b>	<ul style="list-style-type: none"> <li>• Functions</li> <li>• Differentiation</li> <li>• Parametric Equations</li> <li>• Integration</li> <li>• Trigonometry</li> <li>• Sequences &amp; Series</li> <li>• Algebra</li> <li>• Proof</li> <li>• Vectors</li> </ul>	<ul style="list-style-type: none"> <li>• Differentiation applications &amp; Implicit Differentiation.</li> <li>• Differential Equations</li> <li>• Kinematics</li> <li>• Forces &amp; Motion</li> <li>• Moments Of Forces</li> <li>• Revision &amp; Mock Exams</li> <li>• Projectiles</li> <li>• Statistical Distributions</li> <li>• Statistical Hypothesis Testing</li> </ul>	<ul style="list-style-type: none"> <li>• A model for Friction</li> <li>• Numerical Methods</li> <li>• Revision for Exams</li> </ul>
<b>Approximate Number of Lessons</b>	28 Double Lessons	24 Double Lessons	16 Double Lessons
<b>Curriculum Content</b>	<ul style="list-style-type: none"> <li>• Terminology e.g. Range and domain, learn how to find composite &amp; inverse functions. Modulus functions- graph &amp; solve equations &amp; inequalities involving these. Inverse Trig. Functions.</li> <li>• Extension of year 12 differentiation- differentiate trig. &amp; log functions. Use chain, product &amp; quotient rules.</li> <li>• Learn what parametric equations are, sketch curves and differentiate parametric equations.</li> <li>• Extension of year 12 integration- integrate trig. functions. Use of</li> </ul>	<ul style="list-style-type: none"> <li>• Extension of turning points to include stationary &amp; non-stationary points of inflection.</li> <li>• Implicit differentiation &amp; applications.</li> <li>• Forming differential equations from rates of change problems. Solving first order differential equations using separation of variables.</li> <li>• Numerical methods to solve equations: bisection method, decimal search, Newton-Raphson method &amp; fixed point iteration. Trapezium rule for approximations to integrals.</li> <li>• Variable acceleration for objects in 2 and 3 dimensions.</li> <li>• Extend Year 12 forces and motion to include slopes and strings at angles.</li> </ul>	<ul style="list-style-type: none"> <li>• Coulomb's model for friction and apply this to forces problems.</li> <li>• Numerical methods to solve equations: bisection method, decimal search, Newton-Raphson method &amp; fixed point iteration. Trapezium rule for approximations to integrals.</li> <li>• Revision of all content covered in the 2 years and exam practice.</li> </ul>

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	<p>substitution and integration by parts.</p> <ul style="list-style-type: none"> <li>• Further trig. Identities including compound and double angle formulae. Using these to solve further equations and prove more complex trig. Identities.</li> <li>• Notation &amp; terminology. Arithmetic &amp; geometric series- find terms, sums of terms &amp; sums to infinity where appropriate. Further binomial expansion with fractional and negative powers.</li> <li>• Algebraic fractions, expressing fractions as the sum of partial fractions and using this to integrate further expressions and approximate using binomial expansion.</li> <li>• Extension of proof from year 1 to include proof by contradiction.</li> </ul>	<ul style="list-style-type: none"> <li>• Revision of all work covered in years 1 &amp; 2 so far for mock exams.</li> <li>• Projectile motion- use of constant acceleration formulae in 2 dimensions to solve a variety of problems.</li> <li>• Discrete random variables- notation and diagrams. The Normal distribution- notation, calculating probabilities &amp; approximating the binomial distribution.</li> <li>• Learn how to carry out a Normal distribution hypothesis test and a PMCC test for correlation in bivariate data.</li> </ul>	
<b>Links to prior learning</b>	<ul style="list-style-type: none"> <li>• Function notation and composite functions from GCSE.</li> <li>• Year 12 differentiation- differentiate polynomials and use to find equations of tangents &amp; normal to curves, find stationary points and their nature.</li> <li>• Year 12 integration- integrate polynomial expressions both definite and indefinite. Use of</li> </ul>	<ul style="list-style-type: none"> <li>• Calculus from year 12 and last term. Rates of change &amp; forming expressions for these when given in words.</li> <li>• Differentiation from year 1 and last term. Cartesian equations and sketching graphs.</li> <li>• Use of calculus to solve variable acceleration problems in 1 dimension in year 1.</li> </ul>	<ul style="list-style-type: none"> <li>• Forces, equilibrium, constant acceleration, connected objects and Newton's laws covered so far.</li> <li>• Use of calculators for iterative formulae and use of trial &amp; improvement methods to solve equations from GCSE maths.</li> <li>• All content from the 2 year course.</li> </ul>

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	<p>integration to find areas between curves and the x-axis.</p> <ul style="list-style-type: none"> <li>Year 12 Trigonometry- trig. Identities including reciprocal trig.functions and solving trig. Equations in both degrees and radians.</li> <li>GCSE sequences and nth terms.</li> <li>Should be confident at <math>+/-/x/\div</math> and simplifying fractions. Binomial expansion from year 12.</li> <li>Proof from year 1- proof by direct argument, proof by exhaustion and disproof by counter-example.</li> <li>Vectors in 2 dimensions from year 12 including magnitudes and finding vectors joining 2 points.</li> </ul>	<ul style="list-style-type: none"> <li>Newton's laws of motion, equilibrium, equations of motion &amp; connected objects from year 1 Mechanics.</li> <li>All content from the course so far to be included in the mock exams.</li> <li>Constant acceleration formulae and acceleration due to gravity from year 1.</li> <li>Binomial Distribution and calculating probabilities from Year 1.</li> <li>Understand bivariate data and illustrating this using scatter diagrams.</li> </ul>	
<b>Cultural Capital Opportunities</b>	<ul style="list-style-type: none"> <li>Ritangle Competition in early December (problem solving): <a href="https://integralmaths.org/ritangle/">https://integralmaths.org/ritangle/</a></li> <li>Book: The Man Who Knew Infinity by Robert Kanigel.</li> <li>Film: <a href="#">The Man Who Knew Infinity</a></li> </ul>	<ul style="list-style-type: none"> <li>Visit <a href="#">Bletchley Park</a></li> <li>Film: <a href="#">The Imitation Game</a></li> <li>Book: Things to Make and Do in the Fourth Dimension by Matt Parker. (Mrs Smith has a copy you can borrow).</li> <li>Book: Fermat's last Theorem by Simon Singh</li> </ul>	
<b>Assessment Focus</b>	<ul style="list-style-type: none"> <li>Private Study: Topic quiz/tests</li> <li>Chapter Assessments</li> </ul>	<ul style="list-style-type: none"> <li>Private Study: Topic quiz/tests</li> <li>Chapter Assessments</li> <li>Mock Exams</li> </ul>	<ul style="list-style-type: none"> <li>Private Study: Topic quiz/tests</li> <li>Chapter Assessments</li> </ul>

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### Morning Lessons

	Summer Term Year 12				
Unit	Chapter	Topic	Weeks	Integral Link	Scheme Of Learning Link
Pure	6	Trigonometric Functions (Not Inverse Trig. Functions & Graphs)	3	<a href="#">Trigonometric functions</a>	<a href="#">Trigonometric Identities</a>
	Autumn Term Year 13				
Pure	8	Trigonometric Identities	4	<a href="#">Trigonometric identities</a>	<a href="#">Algebra</a>
Pure	3	Sequences and Series	3	<a href="#">Sequences and series</a>	<a href="#">Sequences &amp; Series</a>
Pure	7	Algebra	3	<a href="#">Algebra</a>	<a href="#">Functions</a>
Pure	11	Parametric Equations	2	<a href="#">Parametric equations</a>	<a href="#">Parametric Equations</a>
Pure	1	Proof	1	<a href="#">Proof</a>	<a href="#">Proof</a>
Pure	12	Vectors	1	<a href="#">Vectors</a>	<a href="#">Vectors</a>
	Spring Term Year 13				
Mechanics	18	Kinematics	2	<a href="#">Kinematics</a>	<a href="#">Kinematics</a>
Mechanics	19	Forces & Motion	3	<a href="#">Forces and motion</a>	<a href="#">Forces and Motion</a>
Revision		Revision & Mock Exams	2		
Mechanics	20	Moments of Forces	2	<a href="#">Moments of forces</a>	<a href="#">Moments</a>
Mechanics	21	Projectiles	3	<a href="#">Projectiles</a>	<a href="#">Projectiles</a>
	Summer Term Year 13				
Mechanics	22	A Model For Friction	2	<a href="#">A model for friction</a>	<a href="#">Friction</a>
Statistics	15	Probability	2	<a href="#">Probability</a>	<a href="#">Probability</a>
	Mechanics		<a href="#">Mechanics Revision</a>		
	Statistics		<a href="#">Statistics Revision</a>		

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### Afternoon Lessons

	Summer Term Year 12				
Unit	Chapter	Topic	Weeks	Integral Link	Scheme of Learning Link
Pure	2	Trigonometry	2	<a href="#">Trigonometry</a>	<a href="#">Trigonometry</a>
	Autumn Term Year 13				
Pure	4	Functions Including Inverse Trig. Functions	4	<a href="#">Functions</a>	<a href="#">Trigonometric Functions</a>
Pure	Some of 5 & 9	Differentiation Rules	4	<a href="#">Differentiation</a>	<a href="#">Differentiation</a>
				<a href="#">Further differentiation</a>	<a href="#">Further Differentiation</a>
Pure	10	Integration	5	<a href="#">Integration</a>	<a href="#">Integration</a>
Pure	Some of 5 & 9	Differentiation Applications	1	<a href="#">Differentiation</a>	<a href="#">Differentiation</a>
				<a href="#">Further differentiation</a>	<a href="#">Further Differentiation</a>
	Spring Term Year 13				
Pure	Some of 5 & 9	Differentiation Applications & Implicit Differentiation	3	<a href="#">Differentiation</a>	<a href="#">Differentiation</a>
				<a href="#">Further differentiation</a>	<a href="#">Further Differentiation</a>
Pure	13	Differential Equations	2	<a href="#">Differential equations</a>	<a href="#">Differential Equations</a>
Revision		Revision & Mock Exams	2		
Statistics	16	Statistical Distributions	2	<a href="#">Statistical distributions</a>	<a href="#">Probability Distributions</a>
Statistics	17	Statistical Hypothesis Testing	3	<a href="#">Statistical hypothesis testi</a>	<a href="#">Hypothesis Testing</a>
	Summer Term Year 13				
Pure	14	Numerical Methods	3	<a href="#">Numerical methods</a>	<a href="#">Numerical Methods</a>
	Pure		<a href="#">Revision</a>		
	Comprehension		<a href="#">Comprehension</a>		

Note: Integral is a subscription website so only students will be able to access these links.