

Term	Topic(s)	Assessed Work/Additional Resources
Autumn Term 1 (7 weeks/42 lessons)	<p><b>Pure</b></p> <p>Proof</p> <ul style="list-style-type: none"> <li>Use proof by deduction, proof by exhaustion and proof by contradiction</li> <li>Understand and apply that fact that conjectures that are not true can be disproved using a counterexample</li> <li>Being able to prove that <math>\sqrt{2}</math> is irrational using proof by contradiction</li> <li>Proving the fact there are infinitely many prime numbers using proof by contradiction</li> </ul> <p>Trigonometry</p> <ul style="list-style-type: none"> <li>Understand what a radian is, and why mathematicians use Radians rather than Degrees</li> <li>Being able to convert between Radians and Degrees using formulae and the calculator</li> <li>Sketch the Sine, Cosine and Tangent graphs using radians</li> <li>Being able to solve trigonometric equations working in radians</li> <li>Solving problems involving arc length and area of a sector of circle, where the angle is in radians or degrees</li> <li>Being able to use the small angle approximations for Sine, Cosine and Tangent</li> <li>EXTENSION: Proving the small angle approximations for Sine, Cosine and Tangent</li> </ul> <p>Functions</p> <ul style="list-style-type: none"> <li>Applying combinations of two or more transformations to functions, including translations, stretches and reflections</li> <li>Finding the composite function, denoted by <math>g(f(x))</math> or <math>gf(x)</math> or <math>g \circ f</math></li> <li>Knowing the conditions for the inverse of a function to exist, and how to find it</li> <li>Understanding that the graphs of a function and its inverse are reflections of each other in the line <math>y = x</math></li> <li>Introduction of the modulus function, including being able to sketch graphs of functions involving a modulus</li> <li>Solving equations and inequalities involving a modulus function</li> </ul> <p>Trigonometry Functions</p> <ul style="list-style-type: none"> <li>Introduction of the reciprocal trigonometric functions, <math>\operatorname{cosec} x</math>, <math>\sec x</math> and <math>\cot x</math></li> <li>Using the Pythagorean identities <math>\sec^2 x = 1 + \tan^2 x</math> and <math>\operatorname{cosec}^2 x = 1 + \cot^2 x</math></li> <li>Introduction to the inverse trigonometric functions <math>\arcsin x</math>, <math>\arccos x</math> and <math>\arctan x</math></li> <li>Solving trigonometric equations using the reciprocal trigonometric functions, Pythagorean identities, and inverse trigonometric functions</li> </ul> <p>Sequences and Series</p> <ul style="list-style-type: none"> <li>Understand some terminology including sequences, series, deductive definition, inductive definition, arithmetic sequence, geometric sequence</li> <li>Introduction to the Sigma notation for summation problems</li> <li>Learn how to define and identify an arithmetic sequence, how to find the <math>n</math>th term, how to find the sum of an arithmetic series, and how to solve problems involving arithmetic sequences and series</li> <li>Learn how to define and identify a geometric sequence, how to find the <math>n</math>th term, and how to find the sum of a geometric series</li> <li>Understand what is meant by an infinite geometric series</li> <li>Understanding what is meant by a convergent geometric series, and that a geometric series is convergent if the common ratio is between -1 and 1</li> <li>Being able to find the sum to infinity of a convergent geometric series</li> </ul> <p>Further Algebra</p> <ul style="list-style-type: none"> <li>Using the general binomial expansion of <math>(1 + x)^n</math> where <math>n</math> is any rational number</li> <li>Being able to write <math>(a + x)^n</math> in the form <math>a^n \left(1 + \frac{x}{a}\right)^n</math> before expansion</li> <li>Understand, and deduce what values of <math>x</math> the expansion is valid</li> <li>Being able to simplify rational expressions, including algebraic division</li> </ul>	<p><b>Assessed Work</b></p> <ul style="list-style-type: none"> <li>Homework</li> <li>End-of-topic assessments (completed in class, or at home following direction from the teacher)</li> <li>Classwork</li> </ul> <p><b>Additional Resources</b></p> <ul style="list-style-type: none"> <li><a href="#">Integral</a>, ask your teacher for login details</li> <li>A Level Mathematics For Year 2 4th Edition Book (ISBN: <a href="#">9781471852985</a>)</li> <li><a href="#">Online access</a> to the above book, ask your teacher for login details</li> <li><a href="#">Large dataset</a> for students sitting the A level in the summer of 2023</li> </ul>

	<ul style="list-style-type: none"> <li>• Introduction to partial fractions, where we are able to express algebraic fractions using partial fractions in cases where the denominator has two or three binomials including repeated factors</li> <li>• Using partial fractions with the binomial expansion to find a power series for an algebraic fraction</li> </ul> <p>Trigonometric Identities (Continued next half term)</p> <ul style="list-style-type: none"> <li>• Being able to use the compound angle formulae</li> <li>• Understanding and applying the double angle formulae</li> <li>• Solving trigonometric equations using any of the identities cover so far during A level Mathematics</li> </ul>	
<p>Autumn Term 2 (7 weeks/42 lessons)</p>	<p><b>Pure</b></p> <p>Trigonometric Identities (Continued)</p> <ul style="list-style-type: none"> <li>• Derive a proof which enables the expressions of the form <math>a\sin x + b\cos x</math> to be written in the form <math>r\sin(x \pm \alpha)</math> or <math>r\cos(x \pm \alpha)</math></li> <li>• Solve equations of the form <math>a\sin x + b\cos x = c</math></li> <li>• Sketch graphs of the form <math>y = a\sin x + b\cos x</math></li> </ul> <p>Vectors</p> <ul style="list-style-type: none"> <li>• Extend the work at AS to working with vectors in 3 dimensions</li> <li>• Finding the magnitude of a vector in 3 dimensions</li> <li>• Using vectors to solve problems in both 2 and 3 dimensions</li> </ul> <p>Differentiation (Continued next half term)</p> <ul style="list-style-type: none"> <li>• Understand what is meant by concave upwards and concave downwards in relation to the shape of a curve</li> <li>• Understand what is meant by a point of inflection</li> <li>• Identify a stationary point of inflection and a non-stationary point of inflection</li> <li>• Differentiation composite functions using the chain rule</li> <li>• Understand and use the fact that the derivative of an inverse function can be found using <math>\frac{dx}{dy} = \frac{1}{\frac{dy}{dx}}</math></li> <li>• Solve problems involving connected rates of change using the chain rule</li> <li>• Using the product rule to differentiate two different functions multiplying each other</li> </ul> <p><b>Statistics</b></p> <p>Probability</p> <ul style="list-style-type: none"> <li>• Finding the probability of one event or another in cases where the events are not mutually exclusive events</li> <li>• Find the conditional probability of an event given that another event has occurred</li> </ul> <p>Statistical Distributions (Continued next half term)</p> <ul style="list-style-type: none"> <li>• Use the normal distribution as a model</li> <li>• Understand and recall the shape of a normal curve</li> <li>• Learn that a linear transformation of a normal variable gives another normal variable</li> <li>• Calculate probabilities from a normal distribution, including using calculator functions</li> </ul> <p><b>Mechanics</b></p> <p>Forces and Motion (Continued next half term)</p> <ul style="list-style-type: none"> <li>• Resolve a force into two perpendicular components</li> <li>• Find the resultant force of two or more forces acting on a body, by resolving each force into components and adding</li> <li>• Solve problems involving particles in equilibrium</li> </ul>	<p><b>Assessed Work</b></p> <ul style="list-style-type: none"> <li>• <b>Mock assessments I (Weeks 9 and 10)</b></li> <li>• Homework</li> <li>• End-of-topic assessments (completed in class, or at home following direction from the teacher)</li> <li>• Classwork</li> </ul> <p><b>Additional Resources</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Integral</a>, ask your teacher for login details</li> <li>• A Level Mathematics For Year 2 4th Edition Book (ISBN: <a href="#">9781471852985</a>)</li> <li>• <a href="#">Online access</a> to the above book, ask your teacher for login details</li> <li>• <a href="#">Large dataset</a> for students sitting the A level in the summer of 2023</li> </ul>
<p>Spring Term 1 (6 weeks/36 lessons)</p>	<p><b>Pure</b></p> <p>Differentiation (Continued)</p> <ul style="list-style-type: none"> <li>• Use the quotient rule to differentiate two different functions dividing each other</li> <li>• EXTENSION: Use the product rule to differentiate two different functions dividing each other</li> </ul> <p>Further Differentiation</p> <ul style="list-style-type: none"> <li>• Learn and use the fact that the derivative of the exponential function <math>e^{kx}</math> is <math>ke^{kx}</math></li> <li>• Understand and use the fact that the derivative of the natural logarithm function <math>\ln x</math> is <math>\frac{1}{x}</math></li> </ul>	<p><b>Assessed Work</b></p> <ul style="list-style-type: none"> <li>• <b>Mock assessments II (Week 21)</b></li> <li>• Homework</li> <li>• End-of-topic assessments (completed in class, or at home following direction from the teacher)</li> <li>• Classwork</li> </ul> <p><b>Additional Resources</b></p>

	<ul style="list-style-type: none"> <li>Learn and use the derivatives of trigonometric functions <math>\sin x</math>, <math>\cos x</math> and <math>\tan x</math></li> <li>Use the above rules with the chain rule, product rule and quotient rule to differentiate functions which involve logarithmic or exponential functions</li> <li>Being able to differentiate functions defined implicitly, using implicit differentiation</li> </ul> <p><b>Statistics</b></p> <p>Statistical Distributions (Continued)</p> <ul style="list-style-type: none"> <li>Learn that a continuity correction may be needed when using normal distribution as a model for discrete data</li> <li>Understand that some binomial distributions can be approximated by a normal distribution</li> </ul> <p>Hypothesis Testing (Continued next half term)</p> <ul style="list-style-type: none"> <li>Random samples of size <math>n</math> from <math>X \sim N(\mu, \sigma^2)</math> have the sample mean normally distributed with mean <math>\mu</math> and variance <math>\frac{\sigma^2}{n}</math></li> <li>Carry out a hypothesis test for a mean using the normal distribution and to interpret the results</li> <li>Being able to identify the critical region and acceptance region</li> <li>Understanding what is meant by correlation coefficient and a rank correlation coefficient</li> </ul> <p><b>Mechanics</b></p> <p>Forces and Motion (Continued)</p> <ul style="list-style-type: none"> <li>Solving problems involving Newton's second law in two dimensions</li> </ul> <p>Moments of Forces</p> <ul style="list-style-type: none"> <li>Understand that a force can have a turning effect on a rigid body</li> <li>Find the moment of a force about a point</li> <li>Understand what is meant by equilibrium of a rigid body</li> <li>Solve problems involving equilibrium of a rigid body using moments</li> </ul> <p>A Model for Friction (Continued next half term)</p> <ul style="list-style-type: none"> <li>Learn about the coefficient of friction and that a model for friction is <math>F \leq \mu R</math></li> <li>Understand what is meant by limiting friction</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Integral</a>, ask your teacher for login details</li> <li>A Level Mathematics For Year 2 4th Edition Book (ISBN: <a href="#">9781471852985</a>)</li> <li><a href="#">Online access</a> to the above book, ask your teacher for login details</li> <li><a href="#">Large dataset</a> for students sitting the A level in the summer of 2023</li> </ul>
<p>Spring Term 2</p> <p>(6 weeks/36 lessons)</p>	<p><b>Pure</b></p> <p>Integration (Continued next half term)</p> <ul style="list-style-type: none"> <li>Use a define integral to find the area between two different functions</li> <li>Integrate the functions <math>e^x</math>, <math>\frac{1}{x}</math>, <math>\sin kx</math> and <math>\cos kx</math></li> <li>Learn and use the method of integration by substitution, including all the functions listed above, in cases which are the reverse of the chain rule</li> <li>Integrate expressions by using partial fractions</li> <li>To select an appropriate substitution and apply the method of integration by substitution in cases which are not the reverse of the chain rule</li> </ul> <p>Parametric Equations (Continued next half term)</p> <ul style="list-style-type: none"> <li>Understand the meaning of parametric equations</li> <li>Finding the equivalent Cartesian equation for parametric equations</li> <li>To recognise the equation of a circle in parametric form</li> <li>To find the gradient at a point on a curve define in terms of a parameter by differentiation</li> </ul> <p><b>Statistics</b></p> <p>Hypothesis Testing (Continued)</p> <ul style="list-style-type: none"> <li>Carry out a hypothesis test for correlation or association, using a given correlation coefficient and critical value or a given <math>p</math>-value</li> </ul> <p><b>Mechanics</b></p> <p>A Model for Friction (Continued)</p> <ul style="list-style-type: none"> <li>Solving problems involving friction</li> </ul> <p>Kinematics</p> <ul style="list-style-type: none"> <li>Use the constant acceleration equations in two dimensions</li> <li>Work with variable acceleration in two dimensions</li> <li>Find the equation of a path of a particle, given its position vector</li> </ul> <p>Projectiles (Continued next half term)</p> <ul style="list-style-type: none"> <li>Learn how to model motion of a projectile using constant acceleration equations</li> </ul>	<p><b>Assessed Work</b></p> <ul style="list-style-type: none"> <li><b>Mock assessments II (Week 22)</b></li> <li>Homework</li> <li>End-of-topic assessments (completed in class, or at home following direction from the teacher)</li> <li>Classwork</li> </ul> <p><b>Additional Resources</b></p> <ul style="list-style-type: none"> <li><a href="#">Integral</a>, ask your teacher for login details</li> <li>A Level Mathematics For Year 2 4th Edition Book (ISBN: <a href="#">9781471852985</a>)</li> <li><a href="#">Online access</a> to the above book, ask your teacher for login details</li> <li><a href="#">Large dataset</a> for students sitting the A level in the summer of 2023</li> </ul>

<p>Summer Term 1</p> <p>(6 weeks/24 lessons + 12 revision lessons due to exams)</p>	<p><b>Pure</b></p> <p>Integration (Continued)</p> <ul style="list-style-type: none"> <li>Learn when to, and how to apply integration by parts</li> <li>Understand that integration by parts is the reverse of the product rule</li> <li>EXTENSION: Using integration by parts twice to integrate the multiplication of two functions</li> </ul> <p>Parametric Equations (Continued)</p> <ul style="list-style-type: none"> <li>Being able to apply what was learnt last half-term to find the equations of tangent and normals and the coordinates of stationary points</li> </ul> <p>Differential Equations</p> <ul style="list-style-type: none"> <li>Formulating differential equations given information about rates of change</li> <li>Solve first order ODEs of the form <math>\frac{dy}{dx} = f(x)</math> by direct integration</li> <li>Solve first order ODEs of the form <math>\frac{dy}{dx} = f(x)g(y)</math> by the method of separating the variables</li> <li>Able to find particular solutions from general solutions</li> </ul> <p>Numerical Methods</p> <ul style="list-style-type: none"> <li>Locate the roots of</li> <li><math>f(x) = 0</math> by considering changes of sign of <math>f(x)</math> in an interval in which <math>f(x)</math> is continuous</li> <li>Understand the circumstances under which change of sign methods may fail to give an expected root or may give a false root</li> <li>Use fixed point iteration after rearranging an equation into the form <math>x = g(x)</math>, and understand the significance of staircase and cobweb diagrams</li> <li>Gain the understanding that not all iterations converge to a particular root of an equation</li> <li>Learn and use the Newton-Raphson method to find a numerical solution to an equation</li> <li>Approximate the value of a definite integral using the trapezium rule</li> <li>EXTENSION: Prove the trapezium rule</li> </ul> <p><b>Mechanics</b></p> <p>Projectiles (Continued)</p> <ul style="list-style-type: none"> <li>Solve problems involving projectiles</li> <li>Find the equation of the path of a projectile</li> </ul>	<p><b>Assessed Work</b></p> <ul style="list-style-type: none"> <li><b>Examination season (Weeks 32 and 33)</b></li> <li>Homework</li> <li>End-of-topic assessments (completed in class, or at home following direction from the teacher)</li> <li>Classwork</li> </ul> <p><b>Additional Resources</b></p> <ul style="list-style-type: none"> <li><a href="#">Integral</a>, ask your teacher for login details</li> <li>A Level Mathematics For Year 2 4th Edition Book (ISBN: <a href="#">9781471852985</a>)</li> <li><a href="#">Online access</a> to the above book, ask your teacher for login details</li> <li><a href="#">Large dataset</a> for students sitting the A level in the summer of 2023</li> </ul>
<p>Summer Term 2</p> <p>(3 weeks/18 revision lessons due to exams)</p>	<p>Revision sessions</p> <ul style="list-style-type: none"> <li>Exam practice covering all of the pure, statistics, and mechanics content</li> <li>Revisit the large dataset covered in AS statistics</li> <li>Time spent looking and going through the comprehension paper</li> </ul>	<p><b>Assessed Work</b></p> <ul style="list-style-type: none"> <li><b>Examination season (Weeks 34, 35 and 36)</b></li> </ul> <p><b>Additional Resources</b></p> <ul style="list-style-type: none"> <li><a href="#">Integral</a>, ask your teacher for login details</li> <li>A Level Mathematics For Year 2 4th Edition Book (ISBN: <a href="#">9781471852985</a>)</li> <li><a href="#">Online access</a> to the above book, ask your teacher for login details</li> <li><a href="#">Large dataset</a> for students sitting the A level in the summer of 2023</li> </ul>