

# Year 12 Summer Term Overview

## A2 Mathematics



Subject: Pure Mathematics	
Skills	<p><b>OT1 Mathematical Argument, Language and Proof</b> Construct and present mathematical arguments through appropriate use of diagrams using correct symbols and language, including set notation. Understand and define functions, as well as their domain and range.</p> <p><b>OT2 Mathematical Problem Solving</b> Understand the concept of a mathematical problem-solving cycle and be able to solve problems presented in an unstructured form, clearly communicating solutions in the context of the original problem.</p> <p><b>OT3 Mathematical Modelling</b> Translate a situation in context into a mathematical model whilst using appropriate modelling assumptions.</p>
Knowledge	<p><b>Pure 01 – Algebraic Methods</b> Proof by contradiction, algebraic fractions, partial fractions</p> <p><b>Pure 02 – Functions and Graphs</b> Modulus functions, mappings, domain and range, inverse functions, composite functions, combinations of transformations</p>
Rationale	<p>We make it very clear to learners in Year 13 that the A2 course is very much a development of the skills and knowledge taught in Year 12. It is important that they don't somehow disassociate the 2 courses thinking that Year 13 is a set of 'new' topics. With that in mind, the pure aspect of the course begins with two topics which have clear links to their learning from Year 12: Algebraic Methods; and Functions and Graphs.</p> <p>Both topics allow learners to develop key skills which will be used in later topics.</p>

# Year 12 Summer Term Overview

## A2 Mathematics



Subject: Pure and Statistics	
Skills	<p><b>OT1 Mathematical Argument, Language and Proof</b> Construct and present mathematical arguments through appropriate use of diagrams, graphs and logical deductions using correct symbols and language.</p> <p><b>OT2 Mathematical Problem Solving</b> Understand the concept of a mathematical problem-solving cycle and be able to solve problems presented in an unstructured form, clearly communicating solutions in the context of the original problem.</p> <p><b>OT3 Mathematical Modelling</b> Translate a situation in context into a mathematical model whilst using appropriate modelling assumptions.</p>
Knowledge	<p><b>Applied 01: Regression and Correlation</b> Exponential models in bivariate data; coefficients in an exponential model; product moment correlation coefficient; hypothesis test for zero correlation</p>
Rationale	<p>Learners begin the A2 Statistics content by being introduced to applying the language of statistical hypothesis testing and extending to correlation coefficients as measures of how close data points lie to a straight line and be able to interpret a given correlation coefficient using a given p-value or critical value (calculation of correlation coefficients is excluded). In context, the capital asset pricing model uses linear regression and the concept of beta for analysing and quantifying the systematic risk of an investment. This comes directly from the beta coefficient of the linear regression model that relates the return on the investment to the return on all risky assets.</p>

# Year 12 Summer Term Overview

## A2 Mathematics



Subject: Pure and Mechanics	
Skills	<p><b>OT1 Mathematical Argument, Language and Proof</b> Construct and present mathematical arguments through appropriate use of diagrams using correct symbols and language, including set notation.</p> <p><b>OT2 Mathematical Problem Solving</b> Understand the concept of a mathematical problem-solving cycle and be able to solve problems presented in an unstructured form, clearly communicating solutions in the context of the original problem. Understand, interpret and extract information from diagrams to solve problems.</p> <p><b>OT3 Mathematical Modelling</b> Translate a situation in context into a mathematical model whilst using appropriate modelling assumptions.</p>
Knowledge	<p><b>Applied 04: Moments</b> Resultant moments, equilibrium, centres of mass, tilting</p>
Rationale	<p>Learners begin the Mechanics aspect of the A2 course with Moments. Up until now, learners have only studied situations involving particles. Moments is an opportunity for learners to extend their knowledge to rigid bodies where rotational effects must be considered. Moments provides a clear bridge between the AS and A2 course as learners apply their AS knowledge to new A2 situations.</p>