



# KS4 Curriculum Overview

# Mathematics

## Exam Board & Syllabus: Edexcel

### Curriculum Intent

Our aim is to develop an appreciation for mathematics as a language and a tool to solve problems and analyse the world around us. We hope to inspire creative mathematicians that are able to apply their understanding to other subjects, see the beauty in maths and to always look for the most elegant solution.

By the end of year 11, we aim for all students to have a strong sense of number and to be ready to progress on to future learning or career in a mathematical field.

### How does the KS4 curriculum build on that from KS3?

Our KS4 curriculum builds on KS3 as students continue to study units across the strands of Number, Algebra, Geometry and Measure, Probability and Statistics and Proportional Reasoning. Students are split in to Higher and Foundation tiers for GCSE, building on different levels of understanding of the content covered throughout KS3. Students will go on to study new topics such as Functions, Advanced trigonometry and Circle theorems at Higher, and Trigonometry at the Foundation tier.

### What do students *do* with this knowledge or these skills?

Students will increasingly face more complex problems incorporating several areas of maths. They will need to apply their conditional knowledge to recognise which methods are needed to solve problems. KS4 students will be encouraged to find the most efficient method and present their mathematical arguments logically.

### How does the KS4 curriculum align to the National Curriculum?

Our KS4 curriculum matches the National Curriculum. In addition, our most able students are entered for UKMT challenges and the OCR Level 3 Additional Maths qualification.

What new knowledge or skills are students taught?				
Term	Year 10		Year 11	
	Higher	Foundation	Higher	Foundation
Autumn	<ul style="list-style-type: none"> <li>Ratio</li> <li>Indices and Standard Form</li> <li>Algebraic Expressions and Proof</li> <li>Parallel lines, Internal and External angles</li> <li>Pythagoras (2d &amp; 3d)</li> <li>Right Angled Trigonometry</li> <li>Surds</li> </ul>	<ul style="list-style-type: none"> <li>Multiplying and Dividing</li> <li>Multiples, Factors &amp; Primes</li> <li>Negative Numbers</li> <li>Algebraic Simplification</li> <li>Direct Proportion</li> <li>Solving Equations</li> <li>Fractions</li> </ul>	<ul style="list-style-type: none"> <li>Cosine and sine rule</li> <li>Trigo graphs</li> <li>Geometric sequences</li> <li>Iteration</li> <li>Functions and graphs</li> <li>Graphical transformations</li> <li>Circle theories and proof</li> </ul> <p><b>Additional maths only:</b>            Operations with polynomials            Factor theorem            Graphing polynomial functions            Binomial expansion            Sequence and recurrence relations            Distance, gradient and equations of lines            Equations of circles            Inequalities in 2D            Linear programming</p>	<ul style="list-style-type: none"> <li>Fractions, decimal, and percentages arithmetic</li> <li>Percentage increase, decrease, change and reverse</li> <li>Compound and simple interest</li> <li>Substitution focusing on negative numbers</li> <li>Solving equations</li> <li>Pythagoras</li> <li>Area and perimeter of compound shapes</li> <li>Rounding and estimation</li> <li>Circles</li> <li>Indices</li> <li>Standard index form</li> <li>Expanding brackets and factorising</li> <li>Drawing graphs</li> </ul>
Spring	<ul style="list-style-type: none"> <li>Rearranging formulae</li> <li>Solving linear equations</li> <li>Simultaneous equations</li> <li>Solving Quadratics</li> <li>Venn Diagrams</li> <li>Completing the square</li> <li>Simultaneous equations (quadratic)</li> <li>Area/Perimeter of circles/sectors</li> <li>Volumes of solids &amp; prisms</li> <li>Area/volume scale factors</li> <li>Upper and Lower Bounds</li> </ul>	<ul style="list-style-type: none"> <li>Percentages</li> <li>Venn Diagrams</li> <li>Angles Problems</li> <li>Internal and External Angles of polygons</li> <li>Probability of multiple events</li> <li>Timetables</li> <li>Time Series</li> <li>Standard Form</li> </ul>	<ul style="list-style-type: none"> <li>Vectors</li> <li>Exponential graphs</li> <li>Gradient of a curve</li> <li>Estimating area under a curve</li> <li>Transformations</li> <li>Constructions</li> </ul> <p><b>Additional maths only:</b>            Trigonometry – functions and equations            Trigonometry – identities            Trigonometry – sine and cosine rules            Trigonometry – applications            Products, tree diagrams and venn diagrams            Permutations and combinations</p>	<ul style="list-style-type: none"> <li>Rearranging and solving equations</li> <li>Simultaneous equations</li> <li>Constructions</li> <li>Loci</li> <li>Elevations and plans</li> <li>Angles in parallel lines</li> <li>Bearings</li> <li>Scale Diagrams</li> <li>Congruence and similarity</li> <li>Transformations</li> <li>Vectors</li> <li>Trigonometry</li> </ul>

			Binomial distribution Exponentials and logarithms Iteration Differentiation Integration SUVAT Variable acceleration	
<b>Summer</b>	<ul style="list-style-type: none"> <li>• Probability of multiple events</li> <li>• Averages, Pie Charts, Bar Charts</li> <li>• Linear Graphs</li> <li>• Inequalities</li> <li>• Direct and Inverse Proportion</li> <li>• Histograms</li> <li>• Cumulative Frequency</li> <li>• Ratio</li> </ul>	<ul style="list-style-type: none"> <li>• Linear Graphs</li> <li>• Area (including circles)</li> <li>• Pythagoras</li> <li>• Trigonometry</li> <li>• Charts &amp; Graphs</li> </ul>	Revision and Exams	Revision and Exams
<b>Rationale for this sequencing</b>	<p>The start of the GCSE course includes topics that are essential for future learning. For example, the number and algebra units in the first term of year 10 are needed before students are able to progress on to the later algebra units. Pre-requisites have been taken into consideration when planning the order of units.</p> <p>The sequence has been designed so that students have access to challenging questions, combining different areas of maths that have been covered throughout the course</p>			

### Additional support at home

<b>Additional reading</b> for enjoyment, enhancement and extension	<ul style="list-style-type: none"> <li>• Humble Pi: A Comedy of Maths Errors by Matt Parker</li> <li>• Alex's Adventures in Numberland by Alex Bellos</li> </ul>
<b>Online resources</b> to practice, consolidate and revise	<ul style="list-style-type: none"> <li>• <a href="#">Dr Frost Maths</a></li> <li>• <a href="#">Corbett Maths</a></li> <li>• <a href="#">Maths Genie</a></li> </ul>
<b>Workbooks &amp; revision guides</b> to practice, consolidate and revise	<ul style="list-style-type: none"> <li>• <a href="#">CGP Revision Guide Edexcel Higher</a></li> <li>• <a href="#">CGP Revision Guide Edexcel Foundation</a></li> </ul>