



## KS4 Curriculum: Mathematics

### Curriculum Vision

Edexcel Mathematics GCSE (9-1) 1MA1

The intent of our mathematics curriculum is to inspire our students to continue to study mathematics beyond key stage 4. We do this by offering a coherently sequenced, continually adapted scheme of work that is not only designed to cover the national curriculum, but to do so in a way that improves the depth of understanding and mastery a student achieves as their knowledge develops throughout the key stages.

To support this intent, we use our strong subject knowledge to impart intrigue and scholarship alongside method, by incorporating real life context into our lessons in addition to enrichment opportunities outside of the classroom. We use a variety of retrieval practices to support our teaching and to encourage long term memory transfer, giving our students the fundamental knowledge they need to finish their journey in mathematics as a confident problem solver.

We intend to challenge all our students with an ambitious scheme of work that supports strong outcomes for students and is continually adapted to ensure the same progress for all students. Through continual professional development within the school, we intend to use evidence informed teaching practices to drive developments in our curriculum to ensure it remains robust and inclusive.

### Curriculum Profile

#### Year 10

Autumn Term 1	Autumn Term 2
<u>Bounds and Measurements</u> Know that measurements given to the nearest whole unit may be inaccurate by up to a half a unit in either direction. Use inequality notation to specify <b>error intervals</b> due to rounding or truncation.	<u>Shape and Measures</u> Solve problems involving: <ul style="list-style-type: none"> <li>• Lengths of arcs.</li> <li>• Areas of sectors.</li> <li>• <b>Volumes</b> of pyramids, cones and spheres.</li> </ul>

<p>Find the <b>upper and lower bounds</b> of calculations, particularly in the context of measurement. By considering bounds, calculate values to a <b>suitable degree of accuracy</b>.</p> <p><u>Rearranging Formulae</u> Continue with rearranging formulae, introducing cases where the subject appears as a denominator.</p> <p><u>Manipulating Algebra</u> Manipulate algebraic expressions by canceling common factors in rational expressions (algebraic fractions).</p> <p><b>Factorise</b> all quadratic expressions, including the difference of two squares and expressions where <math>a \neq 1</math>.</p>	<ul style="list-style-type: none"> <li>• <b>Surface areas</b> of pyramids, cylinders, cones and spheres frustums of cones.</li> </ul> <p style="text-align: center;"><i>Section 1 assessment</i></p> <p>Start Section 2</p> <p><u>3D Pythagoras' Theorem and Trigonometry</u> Finding lengths and angles in 3D shapes, including the angle between a line and a plane.</p> <p><u>Proportion</u> Solve problems involving:</p> <ul style="list-style-type: none"> <li>• <b>Direct proportion.</b></li> <li>• <b>Inverse proportion.</b></li> <li>• <b>Proportional reasoning.</b></li> </ul> <p>Know how to represent proportion graphically.</p>
---	--

<b>Spring Term 1</b>	<b>Spring Term 2</b>
<p><u>Circle theorems</u></p> <ul style="list-style-type: none"> <li>• Use and prove angle and tangent properties of circles, including the alternate segment theorem.</li> </ul> <p><u>Histograms</u></p> <ul style="list-style-type: none"> <li>• Draw and interpret histograms for grouped data.</li> <li>• Understand frequency density.</li> <li>• Be able to calculate mean and median from a histogram.</li> </ul> <p style="text-align: center;"><i>Section 2 Assessment</i></p>	<p><u>Surds and Recurring Decimals</u></p> <ul style="list-style-type: none"> <li>• Understand rational and irrational numbers.</li> <li>• Convert a recurring decimal to a fraction.</li> <li>• Simplify expressions involving surds or <math>\pi</math> without the use of a calculator.</li> <li>• Simplify expressions involving powers or surds including rationalising a denominator.</li> </ul> <p><u>Trigonometric graphs</u></p> <ul style="list-style-type: none"> <li>• Sketch the graphs of trigonometric functions for angles of any size.</li> <li>• Know the exact values of the trigonometric ratios for the following angles in degrees; 0,30,45,60,90. Solve trig equations.</li> </ul>

	<p><b><u>Congruency</u></b></p> <ul style="list-style-type: none"> <li>• Understand and use SSS, SAS, ASA and RHS condition to prove the congruence of triangles.</li> <li>• Use construction to show that translations, reflection and rotations preserve length and angle.</li> <li>• Prove congruency by formal geometric proof.</li> </ul> <p style="text-align: right;"><i>Year 10 Mocks</i></p>
--	---

Summer Term 1	Summer Term 2
<p><b><u>Sampling:</u></b> Select a representative sample from a population using random and stratified sampling.</p> <p>Capture-recapture method.</p> <p><b><u>Expanding brackets:</u></b> Expanding brackets including the expansion of 3 brackets eg. <math>(x+1)(x+2)(x+3)</math></p> <p><b><u>Combinatorics:</u></b> Apply systematic listing strategies, including use of the product rule for counting (i.e. if there are m ways of doing one task and for each of these, there are n ways of doing another task, then the total number of ways the two tasks can be done is <math>m \times n</math> ways).</p> <p style="text-align: center;"><i>Section III assessment</i></p>	<p><b><u>Exponential Function:</u></b> Use calculators to explore exponential growth and decay. Construct graphs of exponential functions. Calculate the results of growth and decay over a given time period, e.g. compound interest. Use calculator (table function) to find the time period or a rate by trail and improvement. Understand how to find the <math>n</math>th term of a geometric sequence. Given two points on <math>y = pq^x</math>, be able to find the values of <math>p</math> and <math>q</math>.</p> <p><b><u>Transformations:</u></b> Apply to the graph <math>y = f(x)</math> the transformations:</p> <ul style="list-style-type: none"> <li>• <math>y = f(x)+a</math></li> <li>• <math>y = f(ax)</math></li> <li>• <math>y = f(x+a)</math></li> <li>• <math>y = af(x)</math></li> </ul> <p>for linear, quadratic, sine and cosine functions <math>f(x)</math>.</p>

Year 11

Autumn Term 1	Autumn Term 2
<p><b><u>Solve quadratic equations:</u></b> Completing the square. Using the quadratic formula.</p> <p><b><u>Probability:</u></b> Solve <b>conditional probability</b> problems involving tree diagrams.</p> <p><b><u>Ratios:</u></b> Manipulating <b>ratios</b>, including combining together several ratios and solving algebraic problems.</p> <p style="text-align: center;"><i>Section IV test.</i></p>	<p><b><u>Algebraic fractions:</u></b> Manipulate algebraic expressions including algebraic fractions and solve equations involving algebraic fractions.</p> <p style="text-align: center;"><i>Mock Examination and analysis.</i></p> <p><b><u>Non right angled trig:</u></b> Calculate the area of a triangle using <math>\frac{1}{2}ab\sin C</math> Use the <b>sine and cosine rules</b> to solve 2-D and 3-D problems.</p> <p>Find the area of segments of circles and relate this to the curved surface area of cone.</p> <p><b><u>Coordinate geometry:</u></b> Construct graphs of the <b>circle</b> <math>x^2 + y^2 = r^2</math></p> <p>Find the gradients of parallel and perpendicular lines and use this to find the equation of a tangent to a circle. Find the shortest distance between a point and a line.</p>

Spring Term 1	Spring Term 2
<p><b><u>Simultaneous Equations:</u></b> Find the intersection points of the graphs of a linear and a quadratic, to find approximate solutions to equations. Solve exactly, two <b>simultaneous equations</b>; one linear and the other quadratic.</p> <p>Adjust given quadratic and other graphs by finding a suitable linear equation to solve related problems.</p>	<p><b><u>Using curved graphs:</u></b> Finding areas under graphs. Find and interpret the gradient of a curved graph. Interpreting Distance-time and Velocity-time graphs.</p> <p><b><u>Probability:</u></b> Use Venn diagrams, tree diagrams and two-way tables to find conditional probabilities. General probability rule <math>P(A \text{ and } B) = P(A \text{ given } B) \times P(B)</math></p>

<p><b><u>Vectors:</u></b> Understand and use <b>vector notation</b>. Calculate, and represent graphically the sum and difference of two vectors and scalar multiplication of vectors. Solve geometrical problems in 2-D using vector methods. Proofs involving vectors.</p> <p style="text-align: center;"><i>Section V Assessment</i></p> <p><b><u>Quadratic inequalities:</u></b> Solve Quadratic Inequalities. Use set notation to represent the solution.</p> <p><b><u>Iteration:</u></b> Using an iterative formula to solve and equation. Use sign change to establish the existence of a solution.</p>	<p>Independence is equivalent to <math>p(A \text{ given } B) = p(A)</math> Use algebra to solve probability problems.</p> <p><b><u>Algebraic Proof:</u></b> Use algebra to support and construct arguments and proofs.</p> <p style="text-align: center;"><i>Section VI Assessment</i></p>
---	--

Summer Term 1	Summer Term 2
Revision and Examination technique	Public Examinations

*Please note that this timeline may be subject to change.*

### Assessment and Feedback

All students will:

- Have at least one piece of assessed work reviewed by their teacher per half-term (this increases to two pieces of assessed work if students receive five or more taught hours per fortnight). This will be a piece of assessed homework and a section test in most cases.
- Receive feedback which outlines how they should develop their learning. This feedback should be summative, highlighting both key strengths and key areas for development in students' work.
- Be given the opportunity to act upon their feedback in a structured task. This task should then be reviewed again by the subject teacher. A review of this task can act as the second assessed task. In maths, students will be given an apricot PATH sheet after an assessed homework and an 'acid sheet' after each section test.

### Resources to support learning beyond the classroom

[Course specification](#)

**Links to relevant websites/online resources:**

[MathsBot.com - Tools for Maths Teachers](#)

[StudyMaths.co.uk - GCSE maths revision](#)

[JustMaths - Maths Tutorials, Resources and Support](#)

[GCSE Maths | GCSE Maths Revision and Quizzes \(educationquizzes.com\)](#)

[Transum Mathematics](#)

[GCSEMathsWorksheets | welcome \(mathsociety.org.uk\)](#)

[Maths Teaching Resources | Dr Austin Maths](#)

[Edexcel GCSE Maths 2022 | Save My Exams](#)

[MathsGenie](#)