

# KS5 Curriculum Overview 2021/22

## Department: Maths

### Description of KS5 Curriculum:

The aims and objectives of this curriculum are to enable students to:

- Understand mathematics and mathematical processes in a way that promotes confidence, fosters enjoyment and provides a strong foundation for progress to further study.
- Extend their range of mathematical skills and techniques.
- Understand coherence and progression in mathematics and how different areas of mathematics are connected.
- Apply mathematics in other fields of study and be aware of the relevance of mathematics to the world of work and to situations in society in general.
- Use their mathematical knowledge to make logical and reasoned decisions in solving problems both within pure mathematics and in a variety of contexts, and communicate the mathematical rationale for these decisions clearly.
- Reason logically and recognise incorrect reasoning.
- Use their mathematical skills and techniques to solve challenging problems that require them to decide on the solutions strategy.
- Recognise when mathematics can be used to analyse and solve a problem in context.
- Make deductions and inferences and draw conclusions by using mathematical reasoning.
- Interpret solutions and communicate their interpretation effectively in the context of the problem.
- Read and comprehend mathematical arguments, including justifications of methods and formulae and communicate their understanding.
- Use technology such as calculators and computers effectively and recognise when their use may be inappropriate.

### Sequence of Learning:

KS5	Term 1 Content	Term 2 Content	Term 3 Content
<b>Year 12</b>	<ul style="list-style-type: none"> <li>• Indices.</li> <li>• Surds.</li> <li>• Quadratics &amp; discriminants.</li> <li>• Inequalities.</li> <li>• Cubics/quartics/reciprocal graphs.</li> <li>• Transforming graphs.</li> <li>• Straight lines.</li> <li>• Circles.</li> <li>• Factor theorem &amp; polynomial division.</li> <li>• Binomial.</li> <li>• Triangle geometry.</li> <li>• Trigonometric equations &amp; identities.</li> </ul>	Pure: <ul style="list-style-type: none"> <li>• Vectors in 2D.</li> <li>• Differentiation.</li> <li>• Integration.</li> </ul> Stats: <ul style="list-style-type: none"> <li>• Data/ sampling.</li> <li>• Measures of location.</li> <li>• Measures of speed.</li> <li>• Representation of data.</li> <li>• Probability.</li> </ul> Mechanics: <ul style="list-style-type: none"> <li>• Modelling in mechanics/ vectors.</li> <li>• Force diagrams &amp; calculations.</li> <li>• Connected particles.</li> <li>• Pulleys.</li> </ul>	Stats: <ul style="list-style-type: none"> <li>• Distributions.</li> <li>• Binomial distributions.</li> <li>• Hypothesis testing.</li> </ul> Pure: <ul style="list-style-type: none"> <li>• Exponentials.</li> <li>• logarithms</li> <li>• Algebraic fractions.</li> <li>• Partial fractions.</li> <li>• Mathematical proof.</li> </ul>
<b>Year 13</b>	<ul style="list-style-type: none"> <li>• Intro to radians.</li> <li>• Trigonometry with radians.</li> </ul>	<ul style="list-style-type: none"> <li>• Arithmetic sequences/ series.</li> </ul>	<ul style="list-style-type: none"> <li>• Exponential models.</li> <li>• Correlation &amp; regression.</li> </ul>

	<ul style="list-style-type: none"> <li>● Small angle approximations.</li> <li>● Sec/cosec/cot.</li> <li>● All differentiation &amp; Pythagorean identities.</li> <li>● Addition formula.</li> <li>● Double angles.</li> <li>● Writing expressions in the form of <math>R \sin</math> and <math>R \cos</math>.</li> <li>● Proving trigonometric identities.</li> <li>● Integration &amp; trapezium rule.</li> <li>● Rates of change.</li> <li>● Differentiated equations.</li> <li>● Parameters.</li> <li>● Differentiating parameters.</li> <li>● Proof by contradiction.</li> <li>● Modulus functions.</li> <li>● Composites, inverse &amp; sketching.</li> <li>● Arc length/ area (radians).</li> </ul>	<ul style="list-style-type: none"> <li>● Geometric sequences/ series.</li> <li>● Sum to infinity.</li> <li>● Sigma notation.</li> <li>● Recurrence relations.</li> <li>● Binomial.</li> <li>● Using partial fractions.</li> <li>● Roots.</li> <li>● Iteration.</li> <li>● Newton-raphson.</li> <li>● 3D vectors.</li> <li>● Calculus with kinematics.</li> <li>● Moments.</li> <li>● Centres of Mass, Tilting, Planes &amp; frictions.</li> <li>● Horizontal/ vertical projections.</li> <li>● Statistics.</li> <li>● Rigid bodies &amp; inclined planes.</li> </ul>	<ul style="list-style-type: none"> <li>● Hypothesis testing (correlation).</li> <li>● Conditional probabilities.</li> <li>● Tree diagrams.</li> <li>● Normal distribution.</li> <li>● Standardizing the normal distribution.</li> <li>● Approximating the binomial.</li> <li>● Hypothesis testing (normal)</li> </ul>
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