# Maths Year 11 Higher Tier Curriculum End Points and key vocabulary

| | Autumn Term 1 | Autumn Term 2 | Spring Term 1 | Spring Term 2 | Summer Term 1 | Summer Term 2 |
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| **Unit of Work** | • Properties of number<br>• Linear graphs and sequences<br>• Surds<br>• Probability and probability diagrams | • Simultaneous equations<br>• Direct and inverse proportion<br>• Curves and graphs<br>• Inequalities | • Circle theorems<br>• Proof<br>• Functions<br>• Transforming functions | • Transformations<br>• Constructions and loci<br>• Iterations<br>• Vectors | *Revision and recap* | *Exams* |
| **Ethos Links** | STEM – use of exact calculations and importance of being exact within many STEM careers | STEM – Curves and graphs used to demonstrate exponential growth within bacteria | STEM - Proof is fundamental in mathematics and computer science for verifying algorithms and ensuring system reliability. | STEM and Sustainability – constructions and loci used within relation to landscape planning and gardening.<br>Also used in relation to security cameras. STEM – use of enlargement in scale models | | |
| **Knowledge** | By the end of this unit students will know and understand:<br><br>Properties of number<br>By the end of this unit students will know and understand: | By the end of this unit students will know and understand:<br><br>Simultaneous equations | By the end of this unit students will know and understand:<br><br>Circle theorems<br>By the end of this unit students will know and understand: | By the end of this unit students will know and understand:<br><br>Transformations<br>By the end of this unit students will know and understand: | | |

- How to calculate highest common factor and lowest common multiple
- How to identify and interpret prime factors

Linear graphs and sequences
By the end of this unit students will know and understand:
- Common sequences including geometric progression
- Fibonacci sequences and be able to apply and use them
- How to deduce the nth term of linear sequences
- *How to deduce the nth term of quadratic sequences*

By the end of this unit students will know and understand:
- How to solve simultaneous equations
- How to form simultaneous equations and solve
- *How to solve simultaneous equations with one linear and one quadratic*
- *How to recognise the equation of a circle*
- **Solve simultaneous equations involving circles**

Direct and inverse proportion
By the end of this unit students will know and understand:
- How to recognise

- *Circle theorems and how to calculate missing angles using them*
- *Circle theorem proofs*

Proof
By the end of this unit students will know and understand:
- How to argue mathematically to show algebraic expressions are equivalent and use algebra to support arguments
- *Proof using algebra*

Functions
By the end of this unit students will know and understand:
- How to interpret function notation

- How to transform shapes and recognise a combination of transformations
- **Enlarge by a negative scale factor**

Constructions and loci
By the end of this unit students will know and understand:
- How to construct angle bisectors and perpendicular bisectors
- How to construct a perpendicular to a given line from a given point
- How to solve loci problems
- That the perpendicular distance from a point to a line is the shortest distance to the line

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| | - **Continue and interpret sequences with surds**<br>- How to plot straight line graphs<br>- Parallel lines and how to identify them<br>- *How to find the equation of a line given 2 points*<br>- **How to use y=mx+c to identify perpendicular lines**<br><br>**Surds**<br>By the end of this unit students will know and understand:<br>- Positive integer powers and associated real roots<br>- **How to estimate powers and roots of any given number**<br>- **How to calculate** | direct and inverse proportion<br>- How to interpret worded problems involving direct and inverse proportion<br>- How to construct equations for direct and inverse proportion<br><br>**Curves and graphs**<br>By the end of this unit students will know and understand:<br>- Cubic graphs and how to sketch them<br>- Reciprocal graphs and how to sketch them<br>- *Graphs of exponential functions*<br>- *Trig curves y=cosx* | - Use substitution to evaluate functions<br>- Find the numerical value of composite functions<br>- **Form expressions for composite function**<br>- **Form and use inverse functions**<br><br>**Transforming functions**<br>By the end of this unit students will know and understand:<br>- ***How to sketch translations and reflections of a given function*** | **Use of calculators and Iteration**<br>By the end of this unit students will know and understand:<br>- How to efficiently use their calculators<br>- How to change the subject for iterative equations<br>- ***How to find approximate solutions to equations numerically using iterations***<br><br>**Vectors**<br>By the end of this unit students will know and understand:<br>- Addition and subtraction of vectors<br>- Multiplication of vectors by a scalar<br>- Vectors represented on a diagram<br>- ***How to use vectors to*** | | |

*exactly with surds*
- *How to simplify surds*
- *Rationalising the denominator*
- *Expand double brackets involving surds*

Probability and probability diagrams
By the end of this unit students will know and understand:
- Probability and the outcome of probability experiments
- Frequency trees and how to complete them
- Relative frequency
- Mutually exclusive events
- How to calculate and interpret conditional probabilities

*y=sinx, y=tanx*
- *How to interpret the gradient at a point on a curve as the instantaneous rate of change*
- *The gradient as rate of change*

Inequalities
By the end of this unit students will know and understand:
- How to solve linear inequalities
- How to represent inequalities on a number line
- How to use the inverse to solve two-part inequalities
- *Solve quadratic inequalities*

*construct geometric arguments and proof*
- *How to solve problems with vectors*

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| | with tree diagrams and Venn diagrams<br>• Set notation of Venn diagrams<br>• How to apply systematic listing strategies<br>• The product rule for counting | • *Use set notation*<br>• *Represent inequalities on a graph* | | | | |
| **Key Vocabulary** | Exact<br>Rationalise<br>Denominator<br>Surd<br>Prime factor<br>Highest common factor<br>Lowest common multiple<br>Fibonacci<br>Nth term<br>Arithmetic<br>Geometric | Simultaneous<br>Proportion<br>Direct<br>Inverse<br>Cubic<br>Reciprocal<br>Exponential<br>Gradient<br>Inequality<br>Region | Chord<br>Tangent<br>Alternate segment<br>Centre<br>Circumference<br>Proof<br>Function<br>Composite<br>Inverse<br>Stretch<br>Translate<br>Reflect | Enlarge<br>Reflect<br>Rotate<br>Translate<br>Describe fully<br>Invariance<br>Bisector<br>Locus<br>Iteration<br>Approximation<br>Vector<br>Scalar | | |