



# Curriculum Guide

## Subject: Mathematics

### Year: 10

#### Key Assessment Information:

##### Assessment:

This scheme is followed by the majority of the year group. There are support and extension versions depending on the ability of the pupil.

There will be an assessment once per term testing the topics that have been taught. This is intended to help your son/daughter identify the areas of maths studied that they are good at and those which need further practise. It may also be used, along with teacher input, to reset students to ensure they make the best progress possible. They can revise from their books, or online with Hegarty maths.

An end of year examination will consist of both calculator and non-calculator papers.

- Homework will be based on the topics covered in each module, as listed above.
- They will be asked to complete an exercise, small open-ended task, or an online homework through Hegarty maths, which helps to consolidate or develop the work done in class.
- Hegarty maths has lessons as well as homework tasks. To develop independence, this should be one of the first places students look for help with homework, before asking peers, parents and teachers. Please encourage your child to use it at any time. They have a personal login to record anything they choose to do themselves.
- Please ask them what has been set and feel free to help them.

#### AUTUMN TERM

- |                              |  |
|------------------------------|--|
| Calculating                  | <ul style="list-style-type: none"><li>• calculate with roots, and with integer indices</li><li>• calculate with standard form <math>A \times 10^n</math>, where <math>1 \leq A &lt; 10</math> and n is an integer</li><li>• use inequality notation to specify simple error intervals due to truncation or rounding</li></ul>  |
| Visualising and constructing | <ul style="list-style-type: none"><li>• use the standard ruler and compass constructions</li><li>• use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line</li></ul>  |
| Algebraic Proficiency        | <ul style="list-style-type: none"><li>• construct plans and elevations of 3D shapes</li><li>• understand and use the concepts and vocabulary of identities</li><li>• simplify and manipulate algebraic expressions by expanding products of two binomials and factorising quadratic expressions of the form <math>x^2 + bx + c</math></li><li>• translate simple situations or procedures into algebraic expressions or formulae</li></ul> |
| Proportional reasoning       | <ul style="list-style-type: none"><li>• solve problems involving direct and inverse proportion</li><li>• apply the concepts of congruence and similarity</li><li>• change freely between compound units (e.g. density, pressure)</li><li>• use compound units such as density and pressure</li></ul>   |

#### SPRING TERM

|                                    |  |
|------------------------------------|--|
| Sequences                          | <ul style="list-style-type: none"> <li>recognise and use Fibonacci type sequences, quadratic sequences</li> </ul>  |
| Calculating space                  | <ul style="list-style-type: none"> <li>identify and apply circle definitions and properties</li> <li>calculate arc lengths, angles and areas of sectors of circles</li> <li>calculate surface area of right prisms (including cylinders)</li> <li>calculate exactly with multiples of <math>\pi</math></li> <li>know the formulae for: Pythagoras' theorem, <math>a^2 + b^2 = c^2</math>, and apply it to find lengths in right-angled triangles in two dimensional figures</li> </ul>   |
| Solving equations and inequalities | <ul style="list-style-type: none"> <li>understand and use the concepts and vocabulary of inequalities</li> <li>solve linear inequalities in one variable</li> <li>represent the solution set to an inequality on a number line</li> </ul>  |
| Visualising Algebra                | <ul style="list-style-type: none"> <li>identify and interpret gradients and intercepts of linear functions algebraically</li> <li>use the form <math>y = mx + c</math> to identify parallel lines</li> <li>find the equation of the line through two given points, or through one point with a given gradient</li> <li>recognise, sketch and interpret graphs of quadratic functions, cubic functions and the reciprocal function <math>y = 1/x</math> with <math>x \neq 0</math></li> <li>plot and interpret graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</li> </ul> |

## **SUMMER TERM**

|   |   |
|---|---|
| Conjecturing                                  | <ul style="list-style-type: none"> <li>use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)</li> <li>apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' Theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs</li> </ul>  |
| Further solving of equations and inequalities | <ul style="list-style-type: none"> <li>solve, in simple cases, two linear simultaneous equations in two variables algebraically</li> <li>derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution</li> </ul>  |
| Understanding risk                            | <ul style="list-style-type: none"> <li>find approximate solutions to simultaneous equations using a graph</li> <li>calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</li> <li>enumerate sets and combinations of sets systematically, using tree diagrams</li> <li>understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size</li> </ul> |
| Presenting data                               | <ul style="list-style-type: none"> <li>interpret and construct tables, charts and diagrams, including tables and line graphs for time series data and know their appropriate use</li> <li>draw estimated lines of best fit; make predictions</li> <li>know correlation does not indicate causation; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing</li> </ul>   |

## **Contact Details**

| <b>Head of Department</b> | <b>School Email Address</b>    |
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# Curriculum Guide

## Subject: Mathematics

### Year: 11

#### Key Assessment Information:

##### Assessment:

This scheme is followed by the majority of the year group. There are support and extension versions depending on the ability of the pupil.

There will be a mock GCSE exam in December and another in February. This is intended to help your son/daughter identify the areas of maths studied that they are good at and those which need further practise. It may also be used, along with teacher input, to reset students to ensure they make the best progress possible. They can revise from their books, or online with Hegarty maths.

The summer GCSE exams take place in May and June. There are 3 papers and the first one is always non-calculator.

- Homework will be based on the topics covered in each module, as listed above.
- They will be asked to complete an exercise, past paper, or an online homework through Hegarty maths which helps to consolidate or develop the work done in class.
- Hegarty maths has lessons as well as homework tasks. To develop independence, this should be one of the first places students look for help with homework, before asking peers, parents and teachers. Please encourage your child to use it at any time. They have a personal login to record anything they choose to do themselves.
- Please ask them what has been set and feel free to help them.

#### AUTUMN TERM

|                                    |  |
|------------------------------------|--|
| Properties of shapes               | <ul style="list-style-type: none"><li>• make links to similarity (including trigonometric ratios) and scale factors</li><li>• know the trigonometric ratios and apply it to find angles and lengths in right-angled triangles in two dimensional figures</li></ul>   |
| Calculating                        | <ul style="list-style-type: none"><li>• estimate powers and roots of any given positive number</li><li>• calculate with roots, and with integer and fractional indices</li><li>• calculate exactly with surds</li><li>• apply and interpret limits of accuracy, including upper and lower bounds</li></ul>   |
| Solving equations and inequalities | <ul style="list-style-type: none"><li>• find approximate solutions to equations numerically using iteration</li></ul>  |
| Transformations                    | <ul style="list-style-type: none"><li>• solve two linear simultaneous equations in two variables algebraically</li><li>• identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement (including fractional scale factors)</li><li>• describe the changes and invariance achieved by combinations of rotations, reflections and translations</li></ul>  |
| Algebraic manipulation             | <ul style="list-style-type: none"><li>• simplify and manipulate algebraic expressions involving algebraic fractions</li><li>• manipulate expressions by expanding products of more than two binomials</li><li>• simplify and manipulate algebraic expressions (including those involving surds) by expanding products of two binomials and factorising quadratic expressions of the form <math>x^2 + bx + c</math>, including the difference of two squares</li><li>• manipulate algebraic expressions by factorising quadratic expressions of the form <math>ax^2 + bx + c</math></li></ul> |

## **SPRING TERM**

|                                    |   |
|------------------------------------|---|
| Proportional reasoning             | <ul style="list-style-type: none"><li>interpret equations and graphs that describe direct and inverse proportion</li></ul>  |
| Sequences                          | <ul style="list-style-type: none"><li>deduce expressions to calculate the nth term of quadratic sequences</li><li>recognise and use simple geometric progressions</li></ul>   |
| Further equations and inequalities | <ul style="list-style-type: none"><li>solve linear inequalities in two variables</li></ul>  |
| Calculating space                  | <ul style="list-style-type: none"><li>represent the solution set to an inequality using set notation and on a graph</li><li>calculate surface area and volume of spheres, pyramids, cones and composite solids</li></ul>  |
| Conjecturing                       | <ul style="list-style-type: none"><li>apply the concepts of congruence and similarity, including the relationships between length, areas and volumes in similar figures</li></ul>   |
| Algebra visualising                | <ul style="list-style-type: none"><li>apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results</li><li>plot and interpret graphs in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</li><li>calculate or estimate gradients of graphs and areas under, and interpret results in cases such as distance-time graphs and velocity-time graphs</li><li>interpret the gradient at a point on a curve as the instantaneous rate of change</li><li>identify and interpret roots, intercepts, turning points of quadratic functions graphically</li></ul> |

## **SUMMER TERM**

|                                     |   |
|-------------------------------------|---|
| Fractions, decimals and percentages | <ul style="list-style-type: none"><li>change recurring decimals into their corresponding fractions and vice versa</li><li>set up, solve and interpret the answers in growth and decay problems, including compound interest</li></ul>   |
| Algebra quadratics                  | <ul style="list-style-type: none"><li>solve quadratic equations algebraically by factorising</li><li>find approximate solutions to quadratic equations using a graph</li><li>deduce roots of quadratic functions algebraically</li></ul>  |
| Understanding risk                  | <ul style="list-style-type: none"><li>calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams.</li></ul>   |
| Analysing statistics                | <ul style="list-style-type: none"><li>infer properties of populations or distributions from a sample</li><li>construct and interpret diagrams for grouped discrete data and continuous data</li><li>interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, including box plots</li><li>interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency including quartiles and inter-quartile range</li></ul> |
| Vectors                             | <ul style="list-style-type: none"><li>apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors</li></ul>  |

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