

# Maths Curriculum Map - Year 10

Term	Units of Study	Curriculum Guidelines	NC –Aims / Focus Points
Autumn 1	<p style="text-align: center;"><b>Graphs</b></p> <p style="text-align: center;"><b>Transformations</b></p>	<ul style="list-style-type: none"> <li>• Consolidate their numerical and mathematical capability from key stage 3 and extend their understanding of the number system to include powers, roots {and fractional indices}.</li> <li>• Consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions.</li> <li>• Extend fluency with expressions and equations from key stage 3, to include quadratic equations, simultaneous equations and inequalities.</li> <li>• Move freely between different numerical, algebraic, graphical</li> </ul>	<ul style="list-style-type: none"> <li>• Calculate with roots, and with integer indices.</li> <li>• Calculate exactly with fractions, {surds} and multiples of <math>\pi</math>.</li> <li>• Simplify and manipulate algebraic expressions by:             <ul style="list-style-type: none"> <li>♣ factorising quadratic expressions of the form <math>2x^2 + bx + c</math>, including the difference of two squares.</li> </ul> </li> <li>• Simplifying expressions involving sums, products and powers, including the laws of indices.</li> <li>• Where appropriate, interpret simple expressions as functions with inputs and outputs.</li> <li>• Use the form <math>y - mx - c = +</math> to identify parallel lines; find the equation of the line through two given points, or through one</li> </ul>

		<p>and diagrammatic representations, including of linear, quadratic, and reciprocal.</p> <ul style="list-style-type: none"> <li>• Extend their ability to identify variables and express relations between variables algebraically and graphically.</li> <li>• Reason deductively in geometry, number and algebra, including using geometrical constructions.</li> <li>• Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.</li> <li>• Make and use connections between different parts of mathematics to solve problems</li> </ul>	<p>point with a given gradient.</p> <ul style="list-style-type: none"> <li>• Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically.</li> <li>• Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function <math>y = \frac{1}{x}</math></li> <li>• Plot and interpret graphs (including reciprocal graphs and 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> <li>• Solve quadratic equations algebraically by factorising, find</li> </ul>
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		<p>model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions.</p>	<p>approximate solutions using a graph.</p> <ul style="list-style-type: none"><li>• Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution.</li><li>• Interpret and use fractional scale factors for enlargements.</li><li>• Apply the concepts of congruence and similarity, including the relationships between lengths, in similar figures.</li><li>• Describe translations as 2D vectors</li><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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<p><b>Autumn 2</b></p>	<p><b>Ratio and proportion</b></p>	<ul style="list-style-type: none"> <li>• Consolidate their numerical and mathematical capability from key stage 3 and extend their understanding of the number system to include powers, roots.</li> <li>• Use mathematical language and properties precisely.</li> <li>• Extend and formalise their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphically.</li> <li>• Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning.</li> <li>• Develop their mathematical</li> </ul>	<ul style="list-style-type: none"> <li>• Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios).</li> <li>• Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts.</li> <li>• Interpret equations that describe direct and inverse proportion</li> <li>• Interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion</li> <li>• Set up, solve and interpret the answers in growth and decay problems, including compound interest.</li> </ul>
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		<p>knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.</p> <ul style="list-style-type: none"> <li>• Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts.</li> </ul>	
<p>Spring 1</p>	<p><b>Right-angled triangles</b></p> <p><b>Probability</b></p>	<ul style="list-style-type: none"> <li>• Consolidate their numerical and mathematical capability from key stage 3 and extend their understanding of the number system to include powers, roots.</li> <li>• Select and use appropriate calculation strategies to solve increasingly complex problems, including exact calculations involving multiples of <math>\pi</math>.</li> <li>• Consolidate their algebraic capability from key stage 3 and extend their understanding of</li> </ul>	<ul style="list-style-type: none"> <li>• Calculate with roots, and with integer.</li> <li>• Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios).</li> <li>• Apply the concepts of congruence and similarity, including the relationships between lengths, in similar figures.</li> <li>• Apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles dimensional figures.</li> <li>• Know some of the exact</li> </ul>

		<p>algebraic simplification and manipulation to include quadratic expressions.</p> <ul style="list-style-type: none"> <li>• Use mathematical language and properties precisely.</li> <li>• Extend and formalise their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphically.</li> <li>• Reason deductively in geometry, number and algebra, including using geometrical constructions.</li> <li>• Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning.</li> <li>• Assess the validity of an argument and the accuracy of a given way of presenting</li> </ul>	<p>values of sin cos and tan.</p> <ul style="list-style-type: none"> <li>• Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one .</li> <li>• Use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size.</li> <li>• Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions.</li> </ul>
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		<p>information.</p> <ul style="list-style-type: none"> <li>• Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems</li> <li>• Make and use connections between different parts of mathematics to solve problems.</li> </ul>	
Spring 2	<b>Multiplicative reasoning</b>	<ul style="list-style-type: none"> <li>• Consolidate their numerical and mathematical capability from key stage 3 and extend their understanding of the number system to include powers, roots.</li> <li>• Select and use appropriate calculation strategies to solve increasingly complex problems, including exact calculations involving multiples of <math>\pi</math> use of standard form and application and</li> </ul>	<ul style="list-style-type: none"> <li>• Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios).</li> <li>• Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts.</li> <li>• Understand that X is inversely proportional to Y is equivalent to X is proportional to <math>\frac{1}{Y}</math>.</li> </ul>

		<p>interpretation of limits of accuracy.</p> <ul style="list-style-type: none"><li>• Consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions.</li><li>• Extend fluency with expressions and equations from key stage 3, to include quadratic equations, simultaneous equations and inequalities.</li><li>• Use mathematical language and properties precisely.</li><li>• Extend and formalise their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphically.</li><li>• Extend their ability to</li></ul>	<ul style="list-style-type: none"><li>• Interpret equations that describe direct and inverse proportion.</li><li>• Set up, solve and interpret the answers in growth and decay problems, including compound interest.</li></ul>
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		<p>identify variables and express relations between variables algebraically and graphically.</p> <ul style="list-style-type: none"><li>• Make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counter-examples; begin to use algebra to support and construct arguments.</li><li>• Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning.</li><li>• Assess the validity of an argument and the accuracy of a given way of presenting information.</li><li>• Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.</li></ul>	
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		<ul style="list-style-type: none"><li>• Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts.</li><li>• Make and use connections between different parts of mathematics to solve problems.</li><li>• Model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions.</li><li>• Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem.</li></ul>	
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Summer 1 & 2

**Constructions, loci and bearings**

**Quadratic equations and graphs**

- Consolidate their numerical and mathematical capability from key stage 3 and extend their understanding of the number system.
- Select and use appropriate calculation strategies to solve increasingly complex problems, including exact calculations involving multiples of  $\pi$  use of standard form and application and interpretation of limits of accuracy.
- Use mathematical language and properties precisely.
- Extend and formalise their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphically.

- Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios).
  - Interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion.
- Interpret and use fractional scale factors for enlargements. Construct and interpret plans and elevations of 3D shapes. Interpret and use bearings. Apply the concepts of congruence and similarity, including the relationships between lengths, in similar figures. Calculate with roots, and with integer indices.
- Simplify and manipulate

		<ul style="list-style-type: none"> <li>• Extend their ability to identify variables and express relations between variables algebraically and graphically.</li> <li>• Reason deductively in geometry, number and algebra, including using geometrical constructions.</li> <li>• Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning.</li> <li>• Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.</li> <li>• Model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their</li> </ul>	<p>algebraic expressions (including those involving surds by;</p> <ul style="list-style-type: none"> <li>- factorising quadratic expressions of the form <math>ax^2 + bx + c</math>, including the difference of two squares; simplifying expressions involving sums, products and powers, including the laws of indices</li> <li>• - know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments</li> <li>• - where appropriate, interpret simple expressions as functions with inputs and outputs</li> <li>• Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically.</li> <li>• Recognise, sketch and</li> </ul>
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		<p>solutions may have been affected by any modelling assumptions.</p> <ul style="list-style-type: none"> <li>• Consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions.</li> <li>• Extend fluency with expressions and equations from key stage 3, to include quadratic equations, simultaneous equations and inequalities.</li> <li>• Make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counter-examples; begin to use algebra to support and construct arguments.</li> </ul>	<p>interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function.</p> <ul style="list-style-type: none"> <li>• Solve quadratic equations algebraically by factorising, find approximate solutions using a graph.</li> <li>• Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution.</li> <li>•</li> </ul>
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