Maths

Year 11 (25_26)

Autumn	**Gradients and Lines**	• Draw straight line graphs from a range of given information • Find the equation of a line from a range of given information • Use graphs to solve equations • Explore coordinate geometry to find lengths, midpoints and gradients of line segments • Explore gradients of parallel lines *Students on the higher GCSE pathway will also:* • *Work with equations of perpendicular lines*	**Key Vocabulary** Gradient The steepness of a line. Linear Has a constant additive difference. Perpendicular Two straight lines that intersect at a right angle (at 90º). Reciprocal A pair of numbers with a product of 1 - a multiplicative inverse. Y-intercept The point at which the line crosses the y-axis.
	Non-Linear Graphs	• Plot and read from quadratic, cubic and reciprocal graphs • Interpret roots and intercepts of quadratic graphs *Students on the higher GCSE pathway will also:* • *Explore exponential graphs and equations of circles*	**Key Vocabulary** Quadratic expression An expression with four terms (often simplified to three terms) in which the highest exponent is 2. Quadratic graph A U-shaped graph with a quadratic equation. Roots The values on the x-axis through which a quadratic graph passes. Cubic A curved graph with the highest power being 3 (cubed). Intercept The point where two lines cross. Non-linear The difference between terms is not constant (it may be x, ÷ or some other rule).
	Using Graphs	• Construct and interpret distance-time and conversion graphs • Recognise and interpret graphs that illustrate direct and inverse proportion • Find approximate solutions to equations using graphs *Students on the higher GCSE pathway will also:* • *Estimate the area under a curve using the trapezium rule*	**Key Vocabulary** Gradient The steepness of a line. Trapezium A quadrilateral with one pair of parallel sides Acceleration The rate at which an object's velocity changes over time. Velocity The speed of an object in a given direction. Estimate Roughly judge or calculate the value of.
	Expanding and Factorising	• Revise expanding and factorising with single and double brackets • Expand triple brackets • Solve quadratics by factorisation *Students on the higher GCSE pathway will also:* • *Solve quadratics using the quadratic formula* • *Complete the square*	**Key Vocabulary** Coefficient A number that multiplies a variable or bracket. Expression A mathematical sentence made up of numbers, variables and operations. Factor An integer that divides into a number without leaving a remainder, or integers that multiply to make a specific number. Quadratic expression An expression with four terms (often simplified to three terms) in which the highest exponent is 2. Term (Algebra) A single number or variable, or the product of several numbers and variables. Factorise To put an expression into brackets by dividing by the highest common factor (the opposite of expanding).

Spring	Changing the Subject	• Form and solve linear equations across a variety of mathematical contexts • Change the subject of formulae *Students on the higher GCSE pathway will also:* • *Change the subject where the variable appears more than once* • *Solve equations by iteration*	**Key Vocabulary** Formula A mathematical relationship given in symbols that represent something specific. E.g. b x h = area of rectangle. Inverse A mathematical opposite. Rearrange To change the way an equation is displayed using inverses. Solve To find a numerical value that satisfies a mathematical relationship (makes it true). Subject The isolated variable.
	Functions	• Use function machines with algebraic expressions • Use function notation • Explore graphs of linear/quadratic functions *Students on the higher GCSE pathway will also:* • *Work with composite and inverse functions* • *Solve quadratic inequalities*	**Key Vocabulary** Function A relationship that instructs how to get from an input to an output. Linear Has a constant additive difference. Composite Made up of several parts of elements. Inverse A mathematical opposite. Quadratic expression An expression with four terms (often simplified to three terms) in which the highest exponent is 2.
	Multiplicative Reasoning	• Solve exam-style problems involving ratio, scale factors and direct/inverse proportion • Calculate with pressure and density *Students on the higher GCSE pathway will also:* • *Construct complex proportion equations*	**Key Vocabulary** Ratio A multiplicative relationship describing how two numbers or variables compare. Scale Factor A multiplier describing a change in size (SF more than 1 = increased size, SF less than 1 = decreased size). Direct proportion As one variable is multiplied by a scale factor the other variable is multiplied by the same scale factor. Inverse proportion As one variable is multiplied by a scale factor the other is divided by the same scale factor.
	Geometric Reasoning	• Solve exam-style angle problems involving straight lines, parallel lines and polygons • Prove geometric facts • Solve exam-style problems involving vectors • Solve exam-style trigonometry and Pythagoras' theorem problems *Students on the higher GCSE pathway will also:* • *Revise circle theorems learnt in year 10 and explore four new theorems* • *Solve exam-style problems involving circle theorems*	**Key Vocabulary** Parallel Two straight lines that never intersect and are always the same distance apart (the same gradient). Proof A logical, sequential mathematical argument used to show that a statement is true. Polygon A 2D closed shape made with straight lines. Regular Polygon a shape where all sides and angles are equal in size Vector A quantity with both magnitude and direction.

	Algebraic Reasoning	• Simplify complex algebraic expressions • Solve exam-style problems involving linear sequences • Revise forming and solving linear simultaneous equations *Students on the higher GCSE pathway will also:* • *Find the nth term of a quadratic sequence* • *Solve simultaneous equations with one quadratic* • *Complete exam-style proof questions* • *Explore inequalities in two variables*	**Key Vocabulary** Expression A mathematical sentence made up of numbers, variables and operations. Linear sequence A sequence with a constant difference (amount added or subtracted each time). Quadratic Sequence A sequence with a constant second difference and an nth term of the form an^2+bn+c. Simultaneous equations Groups of equations related to common variables.
	Transforming and Constructing	• Revise performing, identifying and describing transformations of shapes • Perform standard constructions using a ruler and/or a protractor and/or a compass • Solve loci problems *Students on the higher GCSE pathway will also:* • *Identify invariant points and lines* • *Explore trigonometric graphs* • *Explore transformations of graphs*	**Key Vocabulary** Reflect Transform by mapping an object from one position to another of equal distance from a given line. Rotate Transform with a circular movement. Translate Transform with a movement in a vector with an x and y component. Enlarge To change the size of a shape (enlargement is not always making a shape bigger). Locus A set of points with a common property (plural: loci).
	Listing and Describing	• Revise listing, forming sample spaces and calculating probabilities • Revise Venn diagrams • Revise comparing distributions • Revise scatter graphs • Draw plans and elevations of objects *Students on the higher GCSE pathway will also:* • *Solve exam-style problems using the product rule for counting*	**Key Vocabulary** Probability The likelihood of an event happening. Plan A drawing of something from directly above (sometimes birds eye view). Product The result of a multiplication.
	Show that…	• Solve exam-style ‘show that…’ questions in the context of number, algebra, shape, angles and data *Students on the higher GCSE pathway will also:* • *Solve exam-style ‘show that…’ questions with vectors* • *Form proofs with congruent triangles*	**Key Vocabulary** Congruent The same shape and size Vector A quantity with both magnitude and direction. Proof A logical, sequential mathematical argument used to show that a statement is true.

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Summer	**Revision and Examinations**