The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Higher+ Algebra 2

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps to Success	Prior Knowledge: *In order to know this…*	Feedback
To learn how to draw straight line graphs and interpret the equation of a line	• Students will know how to plot straight line graphs in the form y = mx + c by first constructing their own table of values. • Students will know how to plot and draw graphs of straight lines in the form ax + by = c by first rearranging into the form y = mx + c • Students will know how to identify the gradient and y-intercept of a straight line given the equation including where rearrangement is required	**Intercept** – cross **Y-intercept** – the y-intercept tells us where a graph crosses the y-axis, this where x = 0 **X-intercept** – the x-intercept tells us where a graph crosses the x-axis, this where y = 0	**Steps to Success – Plotting Straight Line Graphs** **Step 1**: Use the table of values for your coordinates for drawing the graph. If a table is not provided, create one using the x values on the axis as the x values in your table. Substitute your x values into the equation of the line in order to find your y coordinates. Remember to use brackets and follow BIDMAS. **Step 2**: Choose a pair of coordinates (x,y) from your table to plot on the graph. Remember that the 'x' coordinate is for the horizontal axis and the 'y' coordinate is for the vertical axis. Mark this point on the graph. **Step 3:** Continue this process until all pairs of coordinates have been plotted. **Step 4:** Join up the points with one straight line using a pencil and a ruler. If the coordinates do not form a straight line, check each coordinate is plotted correctly. •	• Students should already know how to draw a graph of an equation given in the form y = mx + c where m is a positive integer	Exam Prep 3
To learn how to calculate gradient and find the equation of a straight line	• Students will know how to calculate gradient between two pairs of coordinates (without a drawn graph). • Students will know that $gradient = \frac{change\ in\ y}{change\ in\ x}$ • Students will know how to find the equation of a given straight line and write it in the form y = mx + c	**Gradient** – steepness.	**Steps to Success – Gradient of a line** **Step 1:** If you are calculating the gradient from a graph, identify two points on the line and write down their coordinates. **Step 2:** Calculate the difference between the y coordinates by subtract the y coordinates from each other. **Step 3:** Calculate the difference between the x coordinates by subtracting the x coordinates from each other. **Step 4:** Substitute the values into the formula $\frac{Change\ in\ y}{Change\ in\ x}$	• Students will need to know how to rearrange formulae	Exam Prep 3
To learn how to find and use the equation of a straight line	• Students will know how to find the gradient and y-intercept for a straight line representing a real-life situation and explain what the two represent in context • Students will know how to determine the equation of a straight line from two pairs of coordinates		**The equation of a straight line – Steps to Success** The equation of any straight line can be written in the general form **y = mx + c** Where **m** is the gradient of the line and **c** is the y-intercept **Step 1:** Identify two pairs of integer coordinates on the given straight line **Step 2:** Work out the difference between the y-coordinates **Step 3:** Work out the difference between the x-coordinates **Step 4:** Calculate the gradient between the two pairs of coordinate using:	• Students will need to know how to calculate gradient between two coordinates	Exam Prep 3

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps to Success	Prior Knowledge: *In order to know this…*	Feedback
			$gradient = \frac{change\ in\ y\ coordinates}{change\ in\ x\ coordinates}$ **Step 5:** Identify the y-intercept of the straight line, this is the point at which the line crosses the y-axis **Step 6:** Substitute the gradient and y-intercept into the equation of the straight line. If the y-intercept is positive, the equation of the line will end in +c, if it is negative it will end in –		
To learn how to find the equation of parallel and perpendicular lines	• Students will know that parallel lines have the same gradient • Students will know how to find the equation of a straight line that is parallel to another given line • Students will know that the gradients of two perpendicular lines are negative reciprocals of one another • Students will know how to find the equation a straight line that is perpendicular to another given line • Students will know how to solve more complex problems involving parallel and perpendicular lines	**Parallel –** parallel lines are two lines that are side by side and have the same distance continuously between them. **Perpendicular –** at a right angle to **Reciprocal** – The reciprocal of a number is 1 divided by the number	**Steps to Success: Finding the equation of a parallel line y = mx + c_2** **Step 1:** Find the gradient of the parallel line, this is the same gradient, m, as the original line. **Step 2:** Find the y-intercept, c_2 , of your parallel line. There are two possible steps: -If you have been given a co-ordinate the parallel line passes through where x = 0, the y co-ordinate is your y–intercept. -If you have been given a co-ordinate the parallel line passes through where x ≠ 0, you will need to substitute your gradient, m, your x co-ordinate and y co-ordinate into y = mx + c and solve for c. **Step 3:** Once you have the gradient and y-intercept of the parallel line, substitute into y = mx + c to find the equation of your parallel line. **Steps to Success – Perpendicular Lines** **Step 1:** Identify the gradient of the line that the new line is perpendicular to. This may require rearranging the equation of the line into the form y = mx + c **Step 2:** To find the gradient of the new line we need to find the negative reciprocal of the gradient of the other line. To do this we change the sign of the gradient and find the reciprocal. We can then write the equation of the new line as y = mx + c with the perpendicular substituted in as m. **Step 3:** Substitute in the coordinates given to you in the question. **Step 4:** Solve the resulting equation to work out the y-intercept (c).	• Students will need to know how to calculate gradient • Students will need to know how to find the reciprocal of an integer • Students will need to know how to find the reciprocal of a fraction	Exam Prep 3

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps to Success	Prior Knowledge: *In order to know this…*	Feedback
To learn how to solve problems involving midpoints and find the length of a line	• Students will know how to find the midpoint of a line • Students will know how to use the midpoint to find the coordinates of the end of a line • Students will know how to solve coordinate problems involving midpoints • Students will know how to find the length of a line using Pythagoras' Theorem	**Midpoint -** the exact middle point.		• Students will need to know how to use Pythagoras' theorem to work out the hypotenuse of a right-angled triangle	Exam Prep 3
To learn how to solve problems involving the equation of straight lines	• Students will know how to solve more complex problems involving coordinates, the equation of straight lines, parallel lines, perpendicular lines and midpoints etc. • Students will know how to find the x-intercept for a straight line	**X-intercept** – the x-intercept tells us where a graph crosses the x-axis, this where y = 0	•	• Students will need to know how to find the equation of a straight line, parallel lines, perpendicular lines and midpoints	Exam Prep 3
To learn how to solve simultaneous equations graphically	• Students will know how to solve linear simultaneous equations and estimate solutions to linear simultaneous equations graphically where straight lines are given and where they need to be drawn		•	• Students will need to know how to draw straight graphs	
To learn how to solve linear simultaneous equations	• Students will know how to solve linear simultaneous equations or find estimates to their solutions given two straight lines drawn on a graph • Students will know how to solve linear simultaneous equations by drawing two straight lines and identifying the x- and y-values for the point of intersection • Students will know how to use elimination to solve linear simultaneous equations algebraically • Students will know how to solve linear simultaneous equations representing a real-life situation and interpret the solution in the context of the problem	**Simultaneous –** occurring, operating, or done at the same time. **Simultaneous equations –** equations involving two or more unknowns that are to have the same values in each equation. **Linear Equation –** an equation between two variables that can be written in the form y=mx+c. Linear equations give a straight line when plotted on a graph.	•	• Students will need to know how to solve linear equations • Students will need to know how to substitute into formulae	Exam Prep 3

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps to Success	Prior Knowledge: *In order to know this…*	Feedback
To learn how to show regions represented by inequalities graphically	• Students will know how to draw and plot inequalities on a graph, using shading to identify the region that satisfies the inequality. Students will know that to do this they must shade/cross out the part of the graph that **does not** satisfy the inequality. • Students will know how to draw more than one inequality on a graph and identify the region that satisfies all inequalities. • Students will know how to identify coordinates that satisfy multiple inequalities using graphs		•	• Students will need to know how to plot straight line graphs	
To learn how to identify the inequalities represented by a region on a graph	• Students will know how to identify the inequalities that are satisfied by a region on a graph		•	• Students will need to know how to find the equation of a line	