The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Higher+ Algebra 1

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 expand and simplify brackets	• Students will know how to expand multiple single brackets and simplify their answers • Students will know how to form expressions involving expanding single brackets • Students will know how to expand and simplify double brackets • Students will know how to form expressions involving expanding double brackets	**Expand –** in maths, expand means multiply out	• **Steps to Success – How do we expand single brackets?** • **Step 1** – Multiply the expression within the brackets by the expression outside the bracket. • In order to expand the full, bracket, make sure to multiply the entire expression rather than just one term within the expression. Remember if there are indices involved that when we multiply we add them. • **Step 2** – Check whether your answer can be simplified. Collect any like terms to simplify the answers.	• Students should already know how to expand single brackets • Students should already know how to expand and simplify multiple single brackets that are both added together and subtracted	Exam Prep 2
To learn how to expand double and triple brackets	• Students will know how to expand and simplify multiple pairs of double brackets • Students will know how to expand three brackets • Students will know how to form expressions involving expanding multiple pairs of double brackets and triple brackets.		• **Expanding Double Brackets – Steps to Success** • **Step 1:** Multiply the first term in the first bracket by the first term in the second bracket. Take care with negatives! • **Step 2:** Multiply the first term in the first bracket by the second term in the second bracket. Take care with negatives! • **Step 3:** Multiply the second term in the first bracket by the first term in the second bracket. Take care with negatives! • **Step 4:** Multiply the second term in the first bracket by the second term in the second bracket. Take care with negatives! • **Step 5:** Simplify your answer by collecting like terms. **Expanding Three Brackets – Steps to Success** **Step 1:** Expand out the first two brackets and simplify your answer. **Step 2:** Put your answer back into a bracket and put the third bracket next to it. **Step 3:** Expand the resulting two brackets by multiplying the first term in the first bracket by both parts of the second bracket, followed by the second term in the first bracket by both parts of the second bracket and then finally the third part of the first bracket by the third part of the second bracket. **Step 4:** Simplify your answer.	• Students should already know how to expand double brackets • Students should already know how to expand and simplify single brackets	Exam Prep 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 factorise into single and double brackets	• Students will know how to factorise algebraic expressions into single brackets • Students will know how to factorise quadratics in the form $ax^2 + bx + c$ where b and c are either positive or negative and a = 1 • Students will know how to factorise the difference of two squares where the coefficient of x^2 is 1	**Factorise –** put back into brackets by bringing common factors outside **Quadratic –** involving a squared algebraic term but no other power higher than 2	**Factorising expressions - Steps to Success** • **Step 1:** Identify the **highest common factor** of the terms, and write it in front of brackets. • **Step 2:** In order to find the **expression** within the brackets, divide the terms by the highest common factor. • **Step 3:** Rewrite your expression with the highest common factor outside the brackets and your new expression within the brackets. **Steps to Success – Factorising quadratics into double brackets** **Step 1:** In order to factorise quadratics, we need to find two numbers where the sum is the coefficient of the x term and the product is the number within the expression. **Step 2:** Once you have found these numbers, a and b, they are then substituted into brackets as follows: $(x \pm a)(x \pm b)$ **You can check your answer by expanding the brackets.**	• Students need to know how to find the HCF of two numbers	Exam Prep 2
To learn how to factorise quadratics where the co-efficient of x^2 is greater than 1	• Students will know how to factorise quadratics in the form $ax^2 + bx + c$ where b and c are either positive or negative and a > 1 • Students will know how to factorise the difference of two squares where the coefficient of x^2 is greater than 1	**Co-efficient –** a number placed before and multiplying the variable in an algebraic expression	**Factorising quadratics in the form $ax^2 + bx + c$ where a > 1** • **Step 1:** Find the two numbers that multiply together to give the product of a and c and sum to b. We will call the two numbers we find 'd' and 'e'. • **Step 2:** Rewrite the factorised expression as $ax^2 \pm dx \pm ex + c$. • **Step 3:** Draw a line down the centre of the new expression, splitting it in half. • **Step 4:** Factorise either side of the line into single brackets. • **Step 5:** Check that the two brackets match and then copy this bracket as one of your brackets. The other bracket comprises of the parts you brought outside of the brackets when you factorised.	• Students should already know how to factorise quadratics in the form $ax^2 + bx + c$ where b and c are either positive or negative and a = 1	Exam Prep 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 solve linear equations	• Students will know how to solve linear equations involving fractions and brackets. • Students will know how to solve linear equations involving unknowns on both sides • Students will know how to solve linear equations with unknowns on both sides including where there are fractions and brackets • Students will know how to solve equations where there is an algebraic fraction on either side of the equals sign (only where the numerator or denominator is a single integer)	**Solve –** find an answer **Equation –** A mathematical statement that two numbers or letters are equal. **Linear Equation –** an equation where the highest power of x is 1. **Inverse –** opposite	• **How do we solve equations?** • If we are asked to solve an equation we are being asked to find the value of the variable. To do this we must isolate the variable to determine the value of a single variable on its own. • To isolate the variable we need to work out what is happening to it in the equation and use inverse operations to undo each step, being careful to ensure we do this in the correct order. • Remember, the equals sign in an equation is vital – whatever we do to one side of the equation to isolate the variable, we must also do to the other side. This is known as the balancing method. •	• Students should already know how to solve simple two step linear equations with one unknown e.g. 2x+3 =15 including where the answer is a fraction/decimal	Exam Prep 2
To learn how to form and solve linear equations	• Students will know how to form and solve linear equations for a worded scenario		**Steps to Success – Forming Algebraic Expressions** • **Step 1:** Form expressions for each worded statement • **Step 2:** Combine your expressions to create an equation (this is usually done by adding the expressions together and making it equal to a total given in the question. Alternatively, you might need to make two algebraic expressions equal to each other – read the question carefully!) • **Step 3:** Solve the equation to find the value of one unknown • **Step 4:** Check what the question is asking you for and ensure you answer the question (this might involve substituting your answer back into one of the expressions you formed at the beginning!)	• Students will need to know how to form expressions • Students will need to know how to solve linear equations	Exam Prep 2
To learn how to form and solve linear equations	• Students will know how to form and solve linear equations involving shape		• **Steps to Success – Forming Algebraic Expressions** • **Step 1:** Form expressions for each worded statement • **Step 2:** Combine your expressions to create an equation (this is usually done by adding the expressions together and making it equal to a total given in the question. Alternatively, you might need to make two algebraic expressions equal to each other – read the question carefully!) • **Step 3:** Solve the equation to find the value of one unknown	• Students will need to know how to calculate perimeter and area • Students will need to know the basic angle facts • Students will need to know the properties of special triangles	Exam Prep 2

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			• **Step 4:** Check what the question is asking you for and ensure you answer the question (this might involve substituting your answer back into one of the expressions you formed at the beginning!)		
To learn how to represent, interpret and solve linear inequalities	• Students will know how to represent inequalities on a number line including where the inequality needs solving first • Students will know how to write the inequality represented on a number line • Students will know how to solve linear inequalities including those involving brackets, fractions and unknowns on both sides • Students will know how to solve linear inequalities in the form a < bx + c < d etc.	**Integer –** whole number **Inequality –** a symbol which makes a non-equal comparison between two numbers or/and letters e.g. >, <, ≥ and ≤ **Satisfies –** meet the expectations **Represent** - show	**How do we solve inequalities?** If we are asked to **solve** an inequality we are being asked to find the value of the **variable**. To do this we must **isolate** the variable to determine the value of a single variable on its own. To isolate the variable we need to work out what is happening to it in the inequality and use **inverse operations** to undo each step, being careful to ensure we do this in the correct order. Remember, the sign is **vital** – whatever we do to one side of the equation to isolate the variable, we must also do to the other side. This is known as the **balancing** method.	• Students will need to know how to solve linear equations • Students should already know how to list integers that satisfy an inequality	Exam Prep 2
To learn how to rearrange formulae	• Students will know how to rearrange formulae involving fractions, powers and roots • Students will know how to rearrange formulae involving brackets • Students will know how to rearrange kinematics formulae and other formulae used in real life • Students will know how to rearrange formulae where factorisation is required to isolate the variable we are trying to make the subject	**Rearrange –** change the position of. **Formula –** A mathematical relationship or rule expressed in symbols. Example $A=\pi r^2$ **Inverse –** opposite	**Steps to Success** Rearranging formulae is when you change the subject of an equation or a formula. • Y is the subject of this formula: • $y = 3x + 2$ • To rearrange formulae we use a method similar to solving equations except that when rearranging formulae you aren't working out an actual value for x, instead you are making a different **variable** the subject of the formula. We can rearrange the formula above to make x the subject. • To do this we need to work out what is currently happening to the **variable** that we want to make the subject and use **inverse operations** to undo each operation and change the subject. You can this of this as doing the opposite in reverse BIDMAS order. • Remember, the equals sign in an equation is **vital** – whatever we do to one side of the equation to isolate the variable, we must also do to the other side. This is known as the **balancing** method. • When we do this to the above formula we get: • $x = \frac{y-2}{3}$	• Students will need to know how to factorise • Students should already know how to rearrange simple formulae	Exam Prep 2

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