Knowledge Rich Curriculum Plan

Year 10 Higher – Algebra 1

Lesson	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success:	Feedback
To learn how to expand brackets.	• Students will know how to expand multiple single brackets involving index laws and then collect the like terms. E.g. $2(x + 3) + 5(2x - 4)$ • Students will know how to expand multiple single brackets involving index laws and then collect the like terms. E.g. $x(x + 3) + x(2x + 4)$ • Students will know how to expand double brackets and simplify answers by collecting like terms. • Students will know how to expand square brackets that lead to a quadratic expression. • Students will know how to expand multiple single brackets involving index laws and then collect the like terms. E.g. $(x + 3)(2x + 4) + (x - 5)(3x - 1)$ • Students will know how to form expressions involving the expansion of single and double brackets.	**Algebraic Expression** – A collection of numbers and letters **Simplify** – make something simpler or easier to use **Co-efficient** – a number placed before and multiplying the letter in an algebraic expression **Expand** – multiply out **Quadratic** – an expression where the highest power of the variable is 2	• Students need to know how to expand single and double brackets.	<u>Steps to Success – Expanding two single brackets</u> **Step 1:** Expand one bracket at a time. Start with bracket 1 - multiply the expression within the brackets by the expression outside the bracket. **Step 2:** Expand bracket 2 - multiply the expression within the brackets by the expression outside the bracket. **Step 3:** Simplify the expression by collecting like terms.	
To learn how to expand triple brackets.	• Students will know how to expand three brackets and simplify answers by collecting like terms. • Students will know how to expand three brackets in the form $(x + 7)^2(x - 4)$. • Students will know how to expand three brackets in the form $(x + 7)^3$. • Students will know how to form expressions involving the expansion of three brackets.	**Cubic** – an expression where the highest power of the variable is 3	• Students need to know how to expand double brackets.	<u>Steps to Success - Expanding three brackets</u> **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.	
To learn how to factorise expression into single and double brackets.	• Students will know how to factorise algebraic expressions into single brackets using a numerical highest common factor. • Students will know how to factorise algebraic expressions into single brackets using an algebraic highest common factor. • Students will know how to factorise algebraic expressions into single brackets using a mixture of numerical and algebraic highest common factors. • 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 into brackets by bringing common factors outside **Highest Common Factor** – the largest number that both numbers can be divided by	• Students need to know how to find the HCF of two numbers.	<u>Steps to Success – Factorising expression into a single bracket</u> **Step 1:** Identify the highest common factor of the terms and write it in front of brackets. **Step 2:** Figure out what you multiply the HCF with to get the first term of the expression given in the question. This will be the first term that you place inside the bracket. **Step 3:** Figure out what you multiply the HCF with to get the second term of the expression given in the question. This will be the second term that you place inside the bracket. <u>Steps to Success – Factorising quadratics into double brackets</u> **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.**	

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To learn how to factorise more difficult quadratic expressions into double brackets.	• Students will know how to factorise quadratics in the form $ax^2 + bx + c$ where a > 1.	**Co-efficient** – a number placed before and multiplying the variable in an algebraic expression	• Students need to know how to factorise into single and double brackets.	<u>Steps to Success - Factorising quadratics in the form $ax^2 + bx + c$ where a > 1</u> **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.	
To learn how to solve linear equations.	• Students will know how to solve simple two step linear equations with one unknown using the balancing method e.g. 2x+3 =15. • Students will be able to solve linear equations involving fractions. E.g. $\frac{x}{4} + 3 = 7$ • Students will know how to solve linear equations involving fractions. E.g. $\frac{2x-3}{4} = 15$ • Students will know how to solve linear equations involving brackets. E.g $2(x+4) = 10$	**Solve** – find an answer **Equation** – a mathematical statement where two algebraic expressions are equal **Linear Equation** – an equation where the highest power of x is 1 **Inverse** - opposite	• Students need to know how to solve one step linear equations.	<u>Steps to Success – Solving two step linear equations</u> **Step 1:** Determine what operation needs to happen first. Do this by going in reverse BIDMAS order. **Step 2:** Carry out the inverse operation across both sides of the equation to keep it balanced. This is usually an addition or subtraction. **Step 3:** Repeat steps one and two until the value of the letter is found. <u>Steps to Success – Solving equations with brackets</u> **Step 1:** Expand the bracket. **Step 2:** Determine what operation needs to happen first. Do this by going in reverse BIDMAS order. **Step 3:** Carry out the inverse operation across both sides of the equation to keep it balanced. This is usually an addition or subtraction. **Step 4:** Repeat steps two and three until the value of the letter is found.	
To learn how to solve linear equations with unknowns on both sides.	• 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 need to know how to expand a single bracket. • Students will need to know how to solve basic two step linear equations including those that involve fractions.	<u>Steps to Success – Solving equations with unknowns on both sides</u> **Step 1:** Select the smallest value of x. **Step 2:** Carry out the inverse operation with the smallest x across both sides of the equation to keep it balanced. **Step 3:** Determine what operation needs to happen first. Do this by going in reverse BIDMAS order. **Step 4:** Carry out the inverse operation across both sides of the equation to keep it balanced. This is usually an addition or subtraction. **Step 5:** Repeat steps two and three until the value of the letter is found.	
To learn how to form and solve linear equations.	• Students will know how to solve worded problems by forming and solving equations. • Students will know how to solve area and perimeter problems by forming and solving equations. • Students will know how to solve angle problems by forming and solving equations.	**Form** – bring together parts **Perimeter** – the distance around the outside of a 2D shape **Area** – the amount of space inside a 2D shape	• Students need to know how to solve linear equations. • Students need to know how to calculate perimeter and area of basic 2D shapes. • Students need to know how to	<u>Steps to Success – Forming and solving equations</u> **Step 1:** Read the question carefully. **Step 2:** Form an expression for the question. This may be in parts to begin with. **Step 3:** Form the equation. **Step 4:** Solve the equation. **Step 5:** Double check that you have found what the question is asking for. Sometimes substitution is needed. <u>Steps to Success – Forming and solving equations involving area and perimeter</u> **Step 1:** Read the question carefully. **Step 2:** Form an expression for the area or perimeter. **Step 3:** Form the equation. **Step 4:** Solve the equation.	

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			calculate missing angles.	**Step 5:** Double check that you have found what the question is asking for. Sometimes substitution is needed. <u>Steps to Success – Forming and solving equations involving shapes</u> **Step 1:** Read the question carefully. **Step 2:** Form an expression for the total of the angles. **Step 3:** Form the equation with knowledge using angle facts. **Step 4:** Solve the equation. **Step 5:** Double check that you have found what the question is asking for. Sometimes substitution is needed.	
To learn how to represent, interpret and solve linear inequalities	• Students will know how to solve two step linear inequalities. • Students will know how to solve simple linear inequalities with one variable and represent the solution set on a number line. **Opportunity for challenge:** • Students will solve an inequality such as $-3 < 2x + 1 < 7$ and show the solution set on a number line. • Students will know how to solve two inequalities in x, find the solution sets and compare them to see which value of x satisfies both.	**Integer** – whole number **Inequality** – a symbol which makes a non-equal comparison between two numbers or/and letters e.g. >, <, $\geq$ and $\leq$ **Satisfies** – meet the expectations **Represent** – show **Solution set** – the values that satisfy an inequality	• Students need to know how to draw and write inequalities using number lines. • Students need to know how to list integers that satisfy an inequality.	<u>Steps to Success – Solving two step linear inequalities</u> **Step 1:** Determine what operation needs to happen first. Do this by going in reverse BIDMAS order. **Step 2:** Carry out the inverse operation across both sides of the inequality to keep it balanced. This is usually an addition or subtraction. **Step 3:** Repeat steps one and two until the value of the letter is found. **Step 4:** Double check that your answer has the inequality in it.	
To learn how to rearrange formulae.	• Students will know how to rearrange simple formulae to change the subject. • Students will know how to rearrange simple formulae involving powers and roots. • Students will know how to rearrange formulae using multiple steps to change the subject. • Students will know how to rearrange kinematic formulae. **Opportunity for challenge:** • Students will know how to rearrange harder formulae where factorisation is needed.	**Rearrange** – change the position of **Change the subject** - rewrite the equation so that a different letter is isolated on one side of the equal's sign **Formulae** – mathematical relationships or rules expressed in symbols, letter and/or numbers. E.g. $A=\pi r^2$ **Inverse** – opposite	• Students will need to know how to solve equations.	<u>Steps to Success – Rearranging formulae</u> **Step 1:** Highlight the letter that you want to isolate. **Step 2:** Determine what operation needs to happen first in order to leave this letter on it own. Do this by going in reverse BIDMAS order. **Step 2:** Carry out the inverse operation across both sides of the formula to keep it balanced. **Step 3:** Repeat steps one and two until the letter is isolated.	
			Exam Preparation 5		