



The Sutton Academy

Knowledge Rich Curriculum Plan

Year 9 Prime – Algebraic Expressions

Lesson/Learning Sequence	Intended Knowledge: <i>Students will know that...</i>	Tiered Vocabulary	Prior Knowledge: <i>In order to know this, students need to already know that...</i>	Assessment
To learn how to simplify algebraic expressions.	<ul style="list-style-type: none"> • Students will know how to simplify algebraic expressions by collecting like terms. • Students will know how to manipulate simple expressions by multiplying or dividing algebraic terms. • Students will know how to simplify expressions using index laws. • Students will know that index laws are the rules for simplifying expressions involving powers of the same base number. • Students will know how to simplify algebraic expressions involving multiplication by correctly applying the index laws. • Students will know how to simplify algebraic expressions involving division by correctly applying the index laws. • Students will know how to simplify algebraic expressions involving brackets by correctly applying the index laws. • Students will know how to simplify algebraic expressions with a mixture of the index laws. 	Algebraic Expression – A collection of variables and/or integers without an equal's sign. It cannot be solved.	<ul style="list-style-type: none"> • Students need to know how to identify expressions, equations, identities and formulae. • Students need to know how to add, subtract, multiply and divide integers. • Students need to know how to square integers. 	Mini-Assessment 3
To learn how to expand single and double brackets.	<ul style="list-style-type: none"> • Students will know how to expand single brackets by multiplying a single integer term over a bracket. E.g. $2(x + 3)$ • Students will know that in order to fully expand a single bracket they must multiply the integer on the outside of the bracket to every term inside the bracket. • Students will know how to expand single brackets by multiplying an algebraic term over a bracket. E.g. $x(x - 4)$ • Students will know how to expand single brackets by multiplying multiple terms over a bracket. e.g. $2ab(4a + b)$ • Students will know how to expand multiple single brackets and simplify the answer by collecting like terms with a mixture of positive and negative values. • 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 form an expression which involves expanding a single bracket. • Students will know that when expanding double brackets, they must multiply every term in the first bracket by every term in the second bracket and then simplify by collecting like terms. • Students will know how to expand double brackets. • Students will know how to form an expression which involves expanding double brackets. 	Expand – in maths, expand means multiply out Quadratic – involving a squared algebraic term but no other power higher than 2	<ul style="list-style-type: none"> • Students need to know how to multiply algebraic expressions. • Students need to know how to use index laws involving multiplications. • Students need to know how to collect like terms. 	Mini-Assessment 3
To learn how to expand triple brackets.	<ul style="list-style-type: none"> • Students will know that when expanding triple brackets, they must multiply every term in the first bracket by every term in the second bracket, simplify by collecting like terms and then expand this solution with the final bracket. • Students will know that the order of expansion does not matter. • Students will know how to expand a double bracket with an extra term on the outside. E.g. $2(x + 5)(x - 4)$ or $x(x + 3)(x - 2)$ • Students will know how to expand triple brackets. E.g. $(x + 6)(x + 5)(x - 4)$ • Students will know how to expand triple brackets involving powers. E.g. $(x + 5)^3$ or $(x - 3)(x + 1)^2$ 		<ul style="list-style-type: none"> • Students need to know how to expand single brackets. • Students need to know how to expand double brackets. 	Mini-Assessment 3
To learn how to factorise expressions into single brackets.	<ul style="list-style-type: none"> • Students will know how to recognise common factors of algebraic terms. • Students will know how to factorise algebraic expressions into a single bracket by taking out common numerical factors. • Students will know how to factorise algebraic expressions into a single bracket by taking out common algebraic factors. 	Factorise – put back into brackets by bringing common factors outside Highest Common Factor – the largest number that both or all of the numbers can be divided by	<ul style="list-style-type: none"> • Students need to know how to multiply and divide algebraic expressions. • Students need to know how to use index laws. 	Mini-Assessment 3

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	<ul style="list-style-type: none"> Students will know how to factorise algebraic expressions into a single bracket by taking out multiple common factors. Students will know that they can check their answers by expanding the bracket in their answer. 			
To learn how to factorise simple quadratic expressions into double brackets.	<ul style="list-style-type: none"> Students will know how to that a quadratic expression is an expression where the highest power of x is 2. Students will know how to factorise quadratic expressions of the form $ax^2 + bx + c$ where a is 1. Students will know how to use the difference of two squares to factorise expressions such as $x^2 - 4$. Students will know that they can check their answers by expanding the brackets in their answer. <p>Opportunity for challenge:</p> <ul style="list-style-type: none"> Students will know how to use the difference of two squares to factorise expressions such as $9x^2 - 4$. 		<ul style="list-style-type: none"> Students need to know how to factorise expressions into single brackets. Students need know how to 	Mini-Assessment 3
To learn how to factorise harder quadratic expressions into double brackets.	<ul style="list-style-type: none"> Students will know how to factorise quadratic expressions of the form $ax^2 + bx + c$ where a is greater than 1. Students will know that they can check their answers by expanding the brackets in their answer. 		<ul style="list-style-type: none"> Students need to know how to factorise quadratic expressions of the form $ax^2 + bx + c$ where a is 1. 	Mini-Assessment 3
To learn how to simplify algebraic fractions.	<ul style="list-style-type: none"> Students will know how to simplify algebraic fractions by cancelling out terms from the numerator and denominator, without factorising. Students will know how to simplify multiple terms in algebraic fractions by cancelling out terms from the numerator and denominator, without factorising. Students will know how to simplify algebraic fractions by factorising the numerator/denominator into single brackets and then simplifying by cancelling out common factors. Students will know how to simplify algebraic fractions by factorising the numerator/denominator into double brackets and then simplifying by cancelling out common factors. Students will know how to simplify algebraic fractions by factorising the numerator/denominator into a mixture of brackets and then simplifying by cancelling out common factors. 		<ul style="list-style-type: none"> Students need to know how to factorise expressions into single brackets. Students need to know how to factorise expressions into double brackets. Students need to know how to simplify fractions. 	Mini-Assessment 3
To learn how to add and subtract algebraic fractions.	<ul style="list-style-type: none"> Students will know how to add algebraic fractions with a numerical denominator. Students will know how to subtract algebraic fractions with a numerical denominator. <p>Opportunity for challenge:</p> <ul style="list-style-type: none"> Students will know how to add or subtract algebraic fractions with an algebraic denominator. 		<ul style="list-style-type: none"> Students need to know how to multiply, add and subtract algebraic expressions. Students need to know how to add and subtract fractions. 	Mini-Assessment 3
To learn how to substitute numbers into expressions and formulae.	<ul style="list-style-type: none"> Students will know that substitute means putting numbers in place of letters to calculate the value of an expression. Students will know how to substitute positive and negative integers into simple algebraic expressions. Students will know that once a substitution has taken place then the order of operations applies. 	<p>Substitution – the action of replacing someone or something with another person or thing. In algebra "substitution" means putting numbers where the letters are in an algebraic expression</p>	<ul style="list-style-type: none"> Students need to know how to use the order of operations. 	Mini-Assessment 3

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	<ul style="list-style-type: none"> • Students will know how to substitute positive and negative integers into simple formulae. • Students will know how to positive and negative numbers into worded formulae. • Students will know how to substitute positive and negative numbers into kinematics formulae. • Students will know that Kinematics concerns the motion of objects. 			
To learn how to solve linear equations.	<ul style="list-style-type: none"> • Students will know how to solve simple two step linear equations with one unknown to find an integer solution. e.g. $2x + 3 = 15$ • Students will know how to solve two step linear equations involving fractions. E.g. $\frac{x}{2} + 3 = 4$ • Students will know how to solve equations involving a bracket. E.g. $2(4x + 6) = 10$ • Students will know that they can get positive and negative solutions. • Students will know how to solve equations which involve expressions over a fraction. E.g. $\frac{2x+3}{4} = 12$ • Students will know how to expressions non-integer solutions. 	<p>Solve – find an answer Equation – A mathematical statement that two amounts, or groups of symbols representing an amount, are equal: Example $3x - 3 = 15$ 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.</p>	<ul style="list-style-type: none"> • Students need to know how to solve one step linear equations. 	Mini-Assessment 3
To learn how to solve linear equations with unknowns on both sides.	<ul style="list-style-type: none"> • Students will know how to solve equations with unknowns on both sides. E.g. $2x + 6 = 4x - 8$ • Students will know how to solve equations involving brackets on both sides. • Students will know how to solve equations involving fractions on both sides. 		<ul style="list-style-type: none"> • Students need to know how to solve two-step linear equations. 	Mini-Assessment 3
To learn how to form and solve linear equations.	<ul style="list-style-type: none"> • Students will know how to write simple expressions based on worded scenarios. • Students will know how to write expressions based on multi-step events. • Students will know how to form and solve simple equations based on worded scenarios. • Students will know how to form equations using multiple expressions to solve a problem. E.g. Age problems with three people. <p>Opportunity for challenge:</p> <ul style="list-style-type: none"> • Students will know how to form and solve equations involving angles. • Students will know how to form and solve equations involving area and perimeter. 		<ul style="list-style-type: none"> • Students need to know how to solve equations. • Students need to know how to identify expressions and equations. 	Mini-Assessment 3
To learn how to change the subject of a formula.	<ul style="list-style-type: none"> • Students will know that the subject of a formula is the variable that can be recognised as on its own on one side of the equation. • Students will know how to rearrange one step formulae to change the subject. E.g. $t = 4g$ • Students will know how to rearrange two step formulae to change the subject. E.g. $r = 4p - h$ • Students will know how to rearrange formulae involving powers and roots to change in the subject. <p>Opportunity for challenge:</p> <ul style="list-style-type: none"> • Students will know how to rearrange formulae involving fractions to change the subject. 	<p>Rearrange – change the position of. Formula – A mathematical relationship or rule expressed in symbols. Example $A=\pi r^2$</p>	<ul style="list-style-type: none"> • Students need to know how to solve linear equations. • Students need to know how to use inverse operations. 	Mini-Assessment 3
To learn how to represent and interpret inequalities on number lines.	<ul style="list-style-type: none"> • Students will know how to use inequality signs to show inclusive and exclusive inequalities. • Students will know that inclusive means inequalities that concerns the symbols \leq, \geq. • Students will know that inclusive means inequalities that concerns the symbols $>, <$. • Students will know how to list some integers that satisfy an inequality. E.g. $x > 4$ or $x \leq 9$. • Students will know how to list integers that satisfy an inequality. e.g. $-2 \leq x < 3$ • Students will know that $<$ and $>$ are represented by an open circle. • Students will know that \leq and \geq are represented by a closed circle. • Students will know how to represent inequalities such as $x \geq 3$. • Students will know that an arrow must be drawn to the end of the number line. 	<p>Inequality – a symbol which makes a non-equal comparison between two numbers or other mathematical expressions e.g. $>, <, \geq$ and \leq Integer – whole number Satisfies – meet the expectations, needs, or desires of</p>	<ul style="list-style-type: none"> • Students need to know the meanings behind inequality notation $- >, <, \geq$ and \leq. 	Mini-Assessment 3

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	<ul style="list-style-type: none"> • Students will know how to represent inequalities such as $-1 < x \leq 3$. • Students will know that a line must connect both circles. • Students will know how to write linear inequalities to represent a set shown on a number line such as $x < 5$ and $2 \leq x < 7$. 			
To learn how to solve linear inequalities.	<ul style="list-style-type: none"> • Students will know that the solution to solving a linear inequality will actually give a range of possible solutions. • Students will know how to solve simple one step linear inequalities. • Students will know how to solve two step linear inequalities. E.g. $2x + 8 \leq 10$ • Students will know how to solve linear inequalities with two signs. • Students will know how to solve inequalities and then represent the solution on a number line. <p>Opportunity for challenge:</p> <ul style="list-style-type: none"> • Students will know how to solve inequalities which involve multiplying or dividing by a negative coefficient. 	<p>Solve – find an answer</p>	<ul style="list-style-type: none"> • Students need to know how to solve one and two step linear equations. 	Mini-Assessment 3