



The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Foundation+ – Calculations

Lesson Objective	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 add and subtract decimals	<ul style="list-style-type: none"> • Students will know how to add and subtract decimals using column addition and subtraction • Students will know that addition and subtraction are inverse operations of one another • Students will know how to add and subtract decimals using column addition and subtraction • Students will know how to solve real life problems, including money problems using column addition and subtraction 	<p>Decimal – a number whose whole number part and the fractional part is separated by a decimal point</p> <p>Integer – a whole number</p> <p>Sum – The result of adding two or more numbers</p>	<ul style="list-style-type: none"> • Students need to know how to add and subtract using the column method. 	Exam Prep 1
To learn how to calculate with negatives	<ul style="list-style-type: none"> • Students will know how to add and subtract positive integers to/from a positive or negative integer • Students will know how to add and subtract negative integers to/from a positive or negative integer • Students will know how to multiply positive and negative integers • Students will know how to divide positive and negative integers • Students will know how to square and cube positive and negative integers • Students will know how to solve real life problems involving calculating with negatives 	<p>Negative – Less than zero</p> <p>Product – in maths, a product is the result of multiplication</p>	<ul style="list-style-type: none"> • Students need to know how to order negative and positive integers 	Exam Prep 1
To learn how to multiply using column multiplication	<ul style="list-style-type: none"> • Students will know how to multiply integers using the column method • Students will know how to solve more complex multi-step and/or worded problems involving multiplication with integers • Students will know how to solve real life problems involving the multiplication of integers using the column method 	<p>Integer – a whole number</p>	<ul style="list-style-type: none"> • Students will need to know how to align numbers in a place value table • Students will need to know how to identify the value of a digit within a number • Students will need to know their times tables • Students will need to know how to add using column addition 	Exam Prep 1
To learn how to multiply decimals	<ul style="list-style-type: none"> • Students will know how to multiply decimals. They will know that to do this they need to multiply the decimals by powers of ten to achieve integers which they can then multiply more easily using column multiplication. They will know that they then divide by an appropriate power of 10 at the end to achieve the accurate answer. • Students will know how to solve worded problems involving multiplication of decimals 		<ul style="list-style-type: none"> • Students will know how to multiply and divide by 10, 100, 1000 etc. • Students need to know how to multiply integers using the column method. 	Exam Prep 1
To learn how to divide using short and long division	<ul style="list-style-type: none"> • Students will know how to divide integers by integers using short division including where the answer is a decimal (they will not use remainders) • Students will know how to divide integers by integers using long division • Students will know how to solve more complex multi-step and/or worded problems involving division 	<p>Divide – the act or process of separating or sharing</p>	<ul style="list-style-type: none"> • Students should already know how to divide an integer by another integer that is <10 using the bus stop method 	Exam Prep 1

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To learn how to divide decimals	<ul style="list-style-type: none"> • Students will know how to divide a decimal by an integer • Students will know how to divide a decimal by a decimal. They will know that the easiest way to do this is to write the calculation as a fraction and eliminate the decimal from the denominator by multiplying the numerator and denominator by an appropriate power of 10 before then carrying out the calculation • Students will know how to solve worded problems involving the division of decimals 	<p>Divide – the act or process of separating or sharing</p>	<ul style="list-style-type: none"> • Students will need to know how to multiply and divide by powers of 10. • Students will need to know how to write equivalent fractions 	Exam Prep 1
To learn how to calculate with indices and roots	<ul style="list-style-type: none"> • Students will know how to calculate real roots of numbers (square root, cube root etc.) • Students will know that powers and their subsequent roots are inverse operations of one another • Students will understand why we can only find certain roots for negative numbers • 	<p>Index – An index, or a power, is the small floating number that goes next to a number or letter</p> <p>Square – When you are asked to square a number you are being asked to multiply it by itself</p> <p>Square numbers – The result when you multiply a number by itself</p> <p>Cube – When you are asked to cube a number you are being asked to multiply it by itself three times!</p> <p>Cube Numbers – The result when you cube a number</p> <p>Index Form – A way of writing a long calculation more quickly using powers</p> <p>Square Root - This is the number that is multiplied by itself to get a square number!</p> <p>Cube Root - This is the number that is multiplied by itself three times to get a cube number!</p>	<ul style="list-style-type: none"> • Students should already know how to square and cube numbers 	Exam Prep 1
To learn how to apply the index laws	<ul style="list-style-type: none"> • Students will know how to use the basic index laws for multiplication, division and brackets with integer bases • Students will know how to find the value of a calculation involving the index laws Students will know how to interpret the power of 0 • Students will know how to evaluate negative powers. They will know that a negative power means that you find the reciprocal. 	<p>Reciprocal – The reciprocal of a number is 1 divided by the number</p>	<ul style="list-style-type: none"> • Students will need to know how to find powers and roots 	Exam Prep 1
To learn how to round to an appropriate degree of accuracy	<ul style="list-style-type: none"> • Students will know how to round to a given number of decimal places. • Students will know how to round to a given number of significant figures • Students will know that nonzero digits are always significant • Students will know that zeros between nonzero digits are always significant • Students will know that leading zeros are never significant • Students will know that trailing zeros are only significant if the number contains a decimal point 	<p>Significant – sufficiently important to be worthy of attention</p> <p>Rounding – making a number simpler but keeping its value close to what it was. The result is less accurate, but easier to use</p> <p>Significant figures – the digits in a number that contribute to the degree of accuracy of the value and that we start counting significant figures at the first nonzero digit</p>	<ul style="list-style-type: none"> • Students should already know how to round to the nearest 10/100/1000 etc. 	Exam Prep 1

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To learn how to estimate	<ul style="list-style-type: none"> • Students will know how to estimate answers to simple calculations by rounding all of the numbers within a question to one significant figure. • Students will know how to estimate answers to more complex, multi-step calculations by rounding numbers within a question to one significant figure including where there is a decimal in the denominator • Students will know how to estimate roots. 	<p>Estimate – an approximate calculation or judgement of the value, number, quantity, or extent of something.</p>	<ul style="list-style-type: none"> • Students will need to know how to round to a given number of significant figures • Students will need to know how to divide by simple decimals 	Exam Prep 1
To learn how to find error intervals	<ul style="list-style-type: none"> • Students will know how to find the upper and lower bounds of numbers given to varying degrees of accuracy • Students will know how to use inequality notation to specify error intervals due to rounding • Students will know how to use inequality notation to specify error intervals due to truncation 	<p>Upper bound – an element greater than or equal to all the elements in a given set Lower bound – an element less than or equal to all the elements in a given set Error interval – an expression written using inequalities that shows the range of possible values that a number could have been before it was rounded or truncated. Inequality – a symbol which makes a non-equal comparison between two numbers or other mathematical expressions e.g. $>$, $<$, \geq and \leq</p>	<ul style="list-style-type: none"> • Students will need to know how to round to decimal places, nearest integer, 10/100/1000 etc. and significant figures 	Exam Prep 1
To learn how to use the order of operations to calculate accurately	<ul style="list-style-type: none"> • Students will know how to apply the order of operations using BIDMAS • Students will know that BIDMAS tells us the order of operations. They will know that the Division and Multiplication are done in the order of the question and that Addition and Subtraction are done last, in the order that they appear in the question. They will not think that division comes before multiplication or addition comes before subtraction. 	<p>Indices – (Plural of index) or powers, are the small floating number that goes next to a number or letter Inverse – opposite</p>	<ul style="list-style-type: none"> • Students will need to add, subtract, multiply and divide accurately • Students will need to have a good knowledge of their times tables • Students will need to know how to write down the value of a positive integer raised to an integer power • Students will need to know how to calculate real roots of numbers (square root, cube root etc.) 	Exam Prep 1