The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Intermediate – Fractions, Decimals and Percentages

Lesson	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success:	Feedback
To learn how to add and subtract fractions.	• Students will know how to add fractions with different denominators. • Students will know how to subtract fractions with different denominators. • Students will know how to add mixed numbers. • Students will know how to subtract mixed numbers. • Students will know to write their answers in the simplest form when possible. • Students will know solve simple real-life problems involving adding and subtracting fractions. • Students will know how to solve multi-step/complex problems involving adding and subtracting fractions.	**Fraction –** a way of representing the parts of a whole **Denominator –** the bottom number in a fraction **Numerator –** the top number in a fraction **Improper Fraction –** a fraction where the numerator is larger than the denominator **Mixed Number –** a number consisting of an integer and a proper fraction **Equivalent –** equal in value **Simplify –** make something simpler or easier to manage **Convert –** change a value from one form to another	• Students need to know how to simplify fractions. • Students need to know how to convert improper fractions to mixed numbers and vice versa.	**Steps to Success – Adding and subtracting fractions** **Step 1:** In order to add and subtract fractions, you need both fractions to have a common denominator. There are two main methods for choosing a common denominator: • Use the lowest common multiple (LCM) of the two denominators. • Use the product of the two denominators. **Step 2:** Once you have chosen your common denominator you have to ensure you keep the fractions equivalent to the original fractions in the question. This means that whatever you have done to the denominator of the original fraction, you must also do to the numerator. **Step 3:** You can now just need to add or subtract the two numerators. The denominator stays the same. **Step 4:** Check whether your answer can be simplified and/or converted into a mixed number.	
To learn how to multiply and divide fractions.	• Students will know how to multiply fractions. • Students will know how to multiply integers by fractions. • Students will know how to multiply mixed numbers. • Students will know how to divide fractions. • Students will know how to divide integers by fractions. • Students will know how to divide fractions by integers. • Students will know how to divide mixed numbers. • Students will know to write their answers in the simplest form when possible. • Students will know solve real-life problems involving multiplying and dividing fractions. Students will know how to solve multi-step/complex problems involving adding, subtracting, multiplying and dividing fractions.	**Reciprocal –** The reciprocal of a number is 1 divided by the number	• Students will need to know how to simplify fractions. • Students will need to know how to convert improper fractions to mixed numbers and vice versa.	**Steps to Success - Multiplying fractions** **Step 1:** Convert any mixed numbers into improper fractions and/or write any integers as a fraction over 1. **Step 2:** Multiply the numerators. **Step 3:** Multiply the denominators. **Step 4:** Check whether your answer can be simplified and/or converted into a mixed number. **Steps to Success - Dividing fractions** **Step 1:** Convert any mixed numbers into improper fractions and/or write any integers as a fraction over 1 **Step 2:** Keep the first fraction the same, change the divide into a multiply and find the reciprocal of the second fraction. **Step 3:** Multiply the numerators. **Step 4:** Multiply the denominators. **Step 5:** Check whether your answer can be simplified and/or converted into a mixed number.	

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To learn how to calculate fractions of amounts.	• Students will know that to find the fraction of a quantity. • Students will know how to find the fraction of a quantity using simple fractions with numerators of 1. eg. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$ • Students will know how to find the fraction of a quantity using fractions with numerators of more than 1. eg. $\frac{2}{3}$, $\frac{3}{4}$, $\frac{7}{10}$ • Students will know how to compare fractions of different quantities. • Students will know how to solve worded problems involving fractions of quantities.	**Quantity** - the amount of something	• Students will need to know how to divide using short division.	**Steps to Success – Fractions of an Amount** **Step 1:** Divide the quantity in the question by the denominator. **Step 2:** Now multiply the answer by the numerator.	
To learn how to convert between fractions, decimals and percentages.	• Students will know how to convert fractions to percentage and decimals with fractions such as $\frac{6}{25}$, $\frac{7}{10}$ and $\frac{3}{8}$. • Students will know how to convert decimals to percentages and fractions using decimals such as 0.45, 0.013 and 1.5. • Students will know how to convert decimals to fractions and percentages with percentages such as 34%, 127% and 42.3%. • Students will know how to convert between fractions, decimals and percentages with a calculator. • Students will know how to order a mixture fractions, decimals and percentages with and without a calculator. • Students will know how to solve worded problems involving converting fractions, decimals and percentages.	**Percentage** – an amount per hundred **Convert –** change a value from one form to another	• Students need to know how to multiply and divide by powers of 10. • Students need to know how to find equivalent fractions.	**Steps to Success – Converting decimals to fractions** **Step 1:** Multiply the decimal by powers of 10 to gain an integer value. **Step 2:** Place the power of 10 used as the denominator. **Steps to Success – Converting decimals to percentages** **Step 1:** All percentage are out of 100. So, multiply the decimal by 100 to turn it into a percentage. **Steps to Success – Converting percentages to decimals** **Step 1:** All percentages are out of 100. So, divide the percentage by 100 to turn it into a decimal. **Steps to Success – Converting percentages to fractions** **Step 1:** All percentage are out of a hundred. So, rewrite the percentage as a fraction. **Step 2:** You may need to multiply the numerator and denominator by powers of 10 to ensure the numerator is an integer. **Step 3:** Check to see if the question asks for the fraction in its simplest form. If so, simplify the fraction. **Steps to Success – Converting fractions to decimals** **Step 1:** When possible find an equivalent fraction with a denominator of 100 or 10. If this is not possible then go straight to step 2. **Step 2:** Divide the numerator by the denominator using short division if necessary. **Steps to Success – Converting fractions to percentages** **Step 1:** When possible find an equivalent fraction with a denominator of 100 – you can then write your percentage straight away as all percentages are out of 100. If this is not possible then go straight to step 2. **Step 2:** Divide the numerator by the denominator using short division if necessary. This will give you a decimal. **Step 3:** Convert the decimal into a percentage by multiplying it by 100.	
To learn how to convert between recurring decimals and fractions.	• Students will know how to convert fractions to recurring decimals using division. • Students will know how to write out recurring decimals. E.g. $0.\dot{4}\dot{5} = 0.4545454\ldots$ • Students will know how to convert recurring decimals to fractions using the algebraic method.	**Recurring** - occurring again, periodically or repeatedly	• Students will need to know how to multiply by powers of 10. • Students will need to know how to write a fraction in its simplest form.	**Steps to Success – Recurring decimals to fractions** **Step 1:** Write out the recurring decimal and put this equal to x. Remember to show the recurring dots on the end of the number or put three dots at the end. **Step 2:** Determine what power of 10 you need to multiply the equation by: • If there is one recurring number, then multiply by 10. • If there are two recurring numbers, then multiply by 100. • IF there are three recurring numbers, then multiply by 1000.	

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				Step 3: Multiply both sides of the equation by this power of 10. Check that your decimals are lined up with the equation of x. **Step 4:** Subtract your x equation from the equation you have just created. You should end up with a simple equation as your recurring decimals should disappear. **Step 5:** Rearrange the equation to make x the subject. **Step 6:** If necessary, multiply the numerator and denominator by a power of 10 to get rid of any decimals. **Step 7:** Simplify the fraction if the question asks you to. ***All working out must be shown***	
To learn how to calculate percentages of amounts without a calculator.	• Students will know how to calculate any percentage of an amount without a calculator. • Students will know that you can find percentages several ways by using a mixture of multiplying, dividing, adding and subtracting the basic percentages (50%, 25%, 10%, 5% and 1%). • Students will know how to find the percentage of an amount using real-life problems including comparisons of two quantities using percentages.	**Percentage** – an amount per hundred **Quantity** - the amount of something **Cultural Capital – Percentages.**	• Students need to know how to find 50%, 25%, 10%, 5% and 1% of a given amount.	**Steps to success- Percentages of amounts** **Step 1:** Recall that percent means out of one hundred, so, when calculating a percentage of amount divide the amount by whatever you would divide 100 by to get to the given percentage. E.g. for 10% divide by 10, for 25% divide by 4, for 50% divide by 2 etc. If you can reach your percentage in one step, then you are finished. **Step 2:** If the question requires you to find a percentage which isn't easily worked out, such as 45% or 68%, you will need to work out a smaller percentage from step 1, and work your way towards the desired number. For example, 45% can be reached by finding 10% and 5%, and multiplying the 10% by 4 to get 40% and adding on the 5%.	
To learn how to increase and decrease amounts using percentages without a calculator.	• Students will know how to increase and decrease an amount using percentages, without a calculator. • Students will know how to increase or decrease an amount using percentages in worded/real-life problems. • Students will be able to calculate simple interest without a calculator.	**Increase –** a rise in the size or amount of something **Decrease –** a drop in the size or amount of something **Interest -** a fee paid for borrowing money or an amount earned by saving money in a bank account **Annum –** year	• Students need to know how to calculate percentages of amounts.	**Steps to Success - Increase and decrease amounts using percentages.** **Step 1:** Find the percentage of the amount of the value in the question. **Step 2:** When a question asks you to increase an amount by a given percentage, you add the percentage of the amount found onto the original value in the question. When a question asks you to decrease an amount by a given percentage, you subtract the percentage of the amount found from the original value in the question. **Step 3:** Check that your answer makes sense. When increasing, the answers should be larger than the original value in the question. When decreasing, the answer should be smaller than the original value in the question. **Steps to success- Simple Interest** **Step 1:** Begin calculating the percentage of the original amount. **Step 2:** Multiply this amount by the number of years the interest has been applied for. **Step 3:** Check what the question wants: • If you need to find only how much interest was gained, you have your answer. If you need to find the total after the interest is applied, add the amount gained from simple interest to the original amount.	
Exam Preparation 3					