The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Higher – Number 2

Lesson	Intended Knowledge:	Tiered Vocabulary	Prior knowledge:	Steps to Success:	Feedback
To learn how to add, subtract, multiply and divide fractions.	• Students will know how to add mixed numbers. • Students will know how to subtract mixed numbers. • Students will know how to multiply integers by fractions. • Students will know how to multiply mixed numbers. • 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 adding, subtracting multiplying and dividing fractions. • Students will know how to solve multi-step/complex problems involving adding, subtracting, multiplying and dividing fractions. **Opportunity for challenge:** • Students will know how to add, subtract, multiply and divide with simple single termed algebraic 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 **Reciprocal –** The reciprocal of a number is 1 divided by the number	• Students need to know how to add, subtract, multiply and divide fractions. • Students need to know how to simplify fractions. • Students need to know how to convert between mixed numbers and improper fractions.	**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. **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.	
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. **Opportunity for challenge:** • Students will know how to carry out calculations involving recurring decimals by converting the decimals to fractions and then carrying out the calculation.	**Recurring -** occurring again periodically or repeatedly	• Students need to know how to multiply by powers of 10. • Students 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. **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***	

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To learn how to solve percentage problems without a calculator.	•Students will know how to express a given number as a percentage of another without a calculator. •Students will know how to solve problems involving expressing one number as a percentage of another . •Students will know how to calculate any percentage of an amount without a calculator. •Students will know how to increase and decrease an amount of measurement by a percentage without a calculator. •Students will know how to use percentages to solve problems, including comparisons of two quantities using percentages. •Students will know how to solve problems involving VAT without a calculator.	**Percentage** – an amount per hundred **Quantity** - the amount of something **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 **VAT – Value Added Tax** – a tax that is applied to the purchase price of certain goods, services and other taxable supplies that are bought and sold within the UK. Standard VAT is 20%.	• Students need to know how to write a number as a fraction of another. • Students will need to know how to calculate a percentage of an amount.	**Steps to success- Expressing a number as a percentage of another number** **Step 1:** Write the given number as a fraction of the total. **Step 2:** 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 3. **Step 3:** Divide the numerator by the denominator using short division if necessary. This will give you a decimal. **Step 4:** Convert the decimal into a percentage by multiplying it by 100.**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%. **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.	
To learn how to solve percentage problems with a calculator.	•Students will know how to calculate any percentage of an amount using a multiplier. •Students will know how to increase and decrease an amount of measurement by a percentage using a multiplier. •Students will know how to solve problems involving simple interest. •Students will know how to use percentages to solve problems, including comparisons of two quantities using percentages. •Students will know how to solve problems complex/multistep percentage problems with a calculator.	**Multiplier** – a value in which another term is multiplied **Annum –** year	• Students need to know how to find a multiplier.	**Steps to Success- Percentage of amount using a calculator** **Step 1:** Calculate the multiplier by converting the percentage into a decimal. **Step 2:** Multiply the multiplier by the amount given in the question. **Steps to Success- Increase an amount using a calculator** **Step 1:** Add your percentage to 100% to find the actual percentage you need to find. **Step 2:** Calculate the multiplier by converting the percentage into a decimal. **Step 3:** Multiply the multiplier by the amount given in the question. **Step 4:** Check your answer makes sense. It should be bigger than the original number. **Steps to Success- Increase an amount using a calculator** **Step 1:** Subtract your percentage from 100% to find the actual percentage you need to find. **Step 2:** Calculate the multiplier by converting the percentage into a decimal. **Step 3:** Multiply the multiplier by the amount given in the question. **Step 4:** Check your answer makes sense. It should be smaller than the original number. **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.	

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				If you need to find the total after the interest is applied, add the amount gained from simple interest to the original amount.	
To learn how to calculate percentage change.	• Students will know how to calculate the value of a profit or loss and use it to determine percentage profit or loss. • Students will know that $percentage\ profit = \frac{profit}{expense} \times 100$ • Students will know that $percentage\ loss = \frac{loss}{expense} \times 100$ • Students will know how to calculate percentage change with and without a calculator. • Students will know how to solve real-life problems involving percentage change.	**Profit –** a financial gain, the difference between the amount earned and the amount spent in buying, operating or producing something **Expense –** the cost incurred in or required for something	• Students need to know how express one number as a percentage of another.	**Steps to Success- Percentage Change** Both profit and loss can follow the same formula: **Step 1:** Identify the change by subtracting the smaller amount from the greater amount. **Step 2:** Identify the original cost or expense. **Step 3:** Substitute into the following formula: $$Percentage\ change = \frac{change}{original\ cost\ or\ expense} \times 100$$	
To learn how to solve problems involving reverse percentages.	• Students will know how to find the original amount given the final amount after a percentage increase or decrease (reverse percentages). • Students will know how to find the original amount using reverse percentages with and without a calculator. • Students will know how to recognise when they need to use reverse percentages. • Students will know how to solve real-life problems using reverse percentages including VAT.		• Students need to know how to solve basic direct proportion problems.	**Steps to Success - Reverse percentages** **Step 1:** There are 3 types of reverse percentage questions. Firstly, identify whether is an increased percentage, a decreased percentage or the same percentage. **Step 2:** • If the original amount has been reduced by a percentage subtract the percentage from 100%. • If the original amount has been increased by a percentage add the percentage to 100%. • If the original amount is equal to the percentage change then go to step 3. **Step 3:** Write this percentage equal to the new amount given in the question. **Step 4:** Divide to find 1%. **Step 5:** Multiply the answer by 100 to find 100%. **Step 6:** Check that the answer looks right. You can also check by calculating the increase/decrease with your answer.	
To learn how to calculate with compound interest and depreciation.	• Students will know how to calculate the compound interest of an amount. • Students will know how to calculate the compound depreciation of an amount. • Students will know how to calculate compound interest or depreciation of an amount using a calculator. • Students will know how to solve a problem involving compound interest or depreciation. • Students will know how to calculate the number of years needed to find a certain total value or interest. **Opportunity for challenge:** • Students will know how to set up a compound interest or depreciation equation to find an unknown percentage.	**Interest -** a fee paid for borrowing money or an amount earned by saving money in a bank account that pays it **Compound Interest –** the interest on a loan or deposit that accrues on both the initial value and the accumulated interest from previous periods. **Depreciation –** a decrease in the value **Accumulated –** built up over time **Accrued –** received **Initial –** starting/original amount **Cultural Capital -Simple Interest Vs Compound Interest**	• Students need to know how to find the percentage increase and decrease of an amount using a multiplier.	**Steps to Success – Compound interest** **Step 1:** Add the percentage to 100% and divide by 100 to find the multiplier. **Step 2:** Calculate the compound interest by filling in the calculation: $$Original\ amount \times multiplier^n$$ Where n is the number of years the money is invested for **Steps to Success – Compound depreciation** **Step 1:** Subtract the percentage from 100% to find the percentage multiplier. **Step 2:** Calculate the compound interest by filling in the calculation: $$Original\ amount \times multiplier^n$$ Where n is the period of time.	

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To learn how to calculate Income tax.	•Students will know about different types of pay. •Students will know about different forms of tax. •Students will know what income tax is and how it is calculated. •Students will know how to carry out income tax calculations.	**Tax –** a compulsory contribution to state revenue, levied by the government on workers' income and business profits, or added to the cost of some goods, services, and transactions **Salary** – the total amount of money that an employee is paid every year to do their job, or one of the payments they receive each month as part of this: an annual/a monthly salary **Gross pay** – this shows how much you will earn before any deductions **National Insurance** – a tax on earnings and self-employed profits paid by employees, employers and the self-employed. They contribute to the costs of certain benefits, the state pension and maternity **Net pay** – this is often known as take-home pay – it's your gross pay minus the deductions **Income Tax –** a compulsory contribution to state revenue, levied by the government on workers' income and business profits, or added to the cost of some goods, services, and transactions. **Deductions** – this is all the money taken from your salary before it is paid to you, e.g. income tax, NI contributions (which help you to qualify for social welfare payments such as Illness Benefit and State Pension), pension, student loan repayments **Cultural capital - payslips**	• Students need to be able to calculate percentages with a calculator.		
Exam Preparation 2					