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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Fractions**  |
| 1. Fraction | A mathematical expression representing the **division** of one integer by another.Fractions are written as **two numbers separated by a horizontal line**. | $\frac{2}{7}$ is a ‘proper’ fraction.$\frac{9}{4}$ is an ‘improper’ or ‘top-heavy’ fraction. |
| 2. Numerator | The **top** number of a fraction. | In the fraction $\frac{3}{5}$, 3 is the numerator. |
| 3. Denominator | The **bottom** number of a fraction. | In the fraction $\frac{3}{5}$, 5 is the denominator. |
| 4. Unit Fraction | A fraction where the **numerator is one** and the denominator is a positive integer. | $\frac{1}{2},\frac{1}{3},\frac{1}{4} etc. $are examples of unit fractions. |
| 5. Reciprocal | The reciprocal of a number is **1 divided by the number**.The reciprocal of $x$ is $\frac{1}{x}$**When we multiply a number by its reciprocal we get 1**. This is called the ‘multiplicative inverse’. | The reciprocal of $5$ is $\frac{1}{5}$The reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$, because $$\frac{2}{3}×\frac{3}{2}=1$$ |
| 6. Mixed Number | A number formed of both an **integer part** and a **fraction part**. | $3\frac{2}{5}$ is an example of a mixed number. |
| 7. Simplifying Fractions | **Divide the numerator and denominator by the highest common factor**. | $$\frac{20}{45}=\frac{4}{9}$$ |
| 8. Equivalent Fractions | Fractions which represent the **same value**. | $$\frac{2}{5}=\frac{4}{10}=\frac{20}{50}=\frac{60}{150} etc.$$ |
| 9. Comparing Fractions | To compare fractions, they each need to be rewritten so that they have a **common denominator**.**Ascending** means **smallest to biggest**.**Descending** means **biggest to smallest**. | Put in to ascending order : $\frac{3}{4}, \frac{2}{3}, \frac{5}{6}, \frac{1}{2}$.Equivalent: $\frac{9}{12}, \frac{8}{12}, \frac{10}{12}, \frac{6}{12}$Correct order: $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}$ |
| 10. Fraction of an Amount | **Divide** by the **bottom**, **times** by the **top** | Find $\frac{2}{5} $of £60$$60÷5=12$$$$12 ×2=24$$ |
| 11. Adding or Subtracting Fractions | Find the **LCM of the denominators** to find a common denominator.Use equivalent fractions to change each fraction to the **common denominator**.Then just **add or subtract the numerators** and keep the **denominator the same**. | $$\frac{2}{3}+\frac{4}{5}$$Multiples of 3: 3, 6, 9, 12, **15**..Multiples of 5: 5, 10, **15**..LCM of 3 and 5 = 15$$\frac{2}{3}=\frac{10}{15}$$$$\frac{4}{5}=\frac{12}{15}$$$$\frac{10}{15}+\frac{12}{15}=\frac{22}{15}=1\frac{7}{15}$$ |
| 12. Multiplying Fractions | **Multiply** the **numerators** together and **multiply** the **denominators** together. | $$\frac{3}{8}×\frac{2}{9}=\frac{6}{72}=\frac{1}{12}$$ |
| 13. Dividing Fractions | **‘Keep it, Flip it, Change it – KFC’**Keep the first fraction the sameFlip the second fraction upside downChange the divide to a multiplyMultiply by the reciprocal of the second fraction. | $$\frac{3}{4}÷\frac{5}{6}=\frac{3}{4}×\frac{6}{5}=\frac{18}{20}=\frac{9}{10}$$ |

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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Basic Percentages**  |
| 1. Percentage | **Number of parts per 100.** | $31\% $means $\frac{31}{100}$ |
| 2. Finding 10% | To find **10%**, **divide by 10** | 10% of £36 = 36÷10=£3.60 |
| 3. Finding 1% | To find **1%**, **divide by 100** | 1% of £8 = 8÷100 = £0.08 |
| 4. Percentage Change | $$\frac{Difference}{Original}×100\%$$ | A games console is bought for £200 and sold for £250.% change = $\frac{50}{200}×100=25\%$ |
| 5. Fractions to Decimals | **Divide the numerator by the denominator** using the bus stop method. | $$\frac{3}{8}= 3÷8=0.375$$ |
| 6. Decimals to Fractions | **Write as a fraction** over 10, 100 or 1000 and simplify. | $$0.36= \frac{36}{100}= \frac{9}{25}$$ |
| 7. Percentages to Decimals | **Divide by 100** | $$8\%=8÷100=0.08$$ |
| 8. Decimals to Percentages | **Multiply by 100** | $$0.4=0.4 ×100\%=40\%$$ |
| 9. Fractions to Percentages | Percentage is just a fraction out of 100. **Make the denominator 100 using equivalent fractions**.When the denominator doesn’t go in to 100, use a calculator and **multiply the fraction by 100**. | $$\frac{3}{25}=\frac{12}{100}=12\%$$$$\frac{9}{17}×100=52.9\%$$ |
| 10. Percentages to Fractions | Percentage is just a fraction out of 100.**Write the percentage over 100** and simplify. | $$14\%= \frac{14}{100}=\frac{7}{50}$$ |

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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Calculating with Percentages**  |
| 1. Increase or Decrease by a Percentage | Non-calculator: **Find the percentage** and **add** or **subtract** it from the **original** amount.Calculator: Find the **percentage multiplier** and multiply. | Increase 500 by 20% (Non Calc):10% of 500 = 50so 20% of 500 = 100500 + 100 = 600Decrease 800 by 17% (Calc):100%-17%=83%83% ÷ 100 = 0.830.83 x 800 = 664 |
| 2. Percentage Multiplier | The **number** you **multiply** a quantity by to **increase or decrease** it by a **percentage**. | The multiplier for increasing by 12% is 1.12The multiplier for decreasing by 12% is 0.88The multiplier for increasing by 100% is 2. |
| 3. Reverse Percentage | Find the **correct percentage given in the question**, then work backwards to **find 100%**Look out for words like ‘**before’** or ‘**original’** | A jumper was priced at £48.60 after a 10% reduction. Find its original price.100% - 10% = 90%90% = £48.601% = £0.54100% = £54 |
| 4. Simple Interest | Interest calculated as a **percentage of the original** amount. | £1000 invested for 3 years at 10% simple interest.10% of £1000 = £100Interest = $3×£100=£300$ |

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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Ratio**  |
| 1. Ratio | Ratio compares the size of **one part** to **another part**.Written using the ‘:’ symbol. | ratio 3:1 |
| 2. Proportion | Proportion compares the size of **one part** to the size of the **whole**.Usually written as a fraction. | In a class with 13 boys and 9 girls, the proportion of boys is $\frac{13}{22}$ and the proportion of girls is $\frac{9}{22}$ |
| 3. Simplifying Ratios | **Divide** all parts of the ratio by a **common factor**. | 5 : 10 = 1 : 2 (divide both by 5)14 : 21 = 2 : 3 (divide both by 7) |
| 4. Ratios in the form $1 : n$ or $n : 1$ | **Divide** both parts of the ratio by one of the numbers to make **one part equal 1**. | 5 : 7 = 1 : $\frac{7}{5}$ in the form 1 : n5 : 7 = $\frac{5}{7}$ : 1 in the form n : 1 |
| 5. Sharing in a Ratio | **1. Add** the total parts of the ratio.**2. Divide** the amount to be shared by this value to find the value of one part.**3. Multiply** this value by each part of the ratio.Use only if you **know the total**. | Share £60 in the ratio 3 : 2 : 1.3 + 2 + 1 = 660 ÷ 6 = 103 x 10 = 30, 2 x 10 = 20, 1 x 10 = 10£30 : £20 : £10 |
| 6. Proportional Reasoning | Comparing two things using **multiplicative reasoning** and applying this to a new situation.Identify one multiplicative link and use this to find missing quantities. | Image result |
| 7. Unitary Method | Finding the **value of a single unit** and then finding the necessary value by **multiplying** the single unit value. | 3 cakes require 450g of sugar to make. Find how much sugar is needed to make 5 cakes.3 cakes = 450gSo 1 cake = 150g (÷ by 3)So 5 cakes = 750 g (x by 5) |
| 8. Ratio already shared | Find what **one part** of the ratio is worth using the **unitary method**. | Money was shared in the ratio 3:2:5 between Ann, Bob and Cat. Given that Bob had £16, found out the total amount of money shared.£16 = 2 partsSo £8 = 1 part3 + 2 + 5 = 10 parts, so 8 x 10 = £80 |
| 9. Best Buys | Find the **unit cost** by **dividing** the **price by the quantity**.The **lowest** number is the best value. | 8 cakes for £1.28 🡪 16p each (÷by 8)13 cakes for £2.05 🡪 15.8p each (÷by 13)Pack of 13 cakes is best value. |



**Knowledge Organiser**