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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 = $3×£100=£300$ |

**Knowledge Organiser**