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Applications of Percent and Problem Solving

*Definition 1: Percent is defined as the number of hundredths. In other words, a certain number as a part of 100. Percent is denoted as

$$\boxed{?} \% = \frac{\boxed{?}}{100}$$

* How to write percents?

Answer:

Step 1: If you have a decimal, then you need to move the decimal point two places to the write such as $0.54 \Rightarrow$ So, it becomes $54\boxed{\%} \leftarrow$ make sure that $\%$ is written at the end.

Step 2: If you have a fraction, then you need to convert it to decimal and then you can apply step 1 above:

Example 1: $\frac{1}{4} \Rightarrow 0.25 \Rightarrow \boxed{25\%}$.

Example 2 | Convert the following to percents:

Part ⓐ : 0.67

Answer: $0.\overset{\curvearrowright}{67}$ = $\boxed{67\%}$

Part ⓑ : $\frac{1}{2}$

Answer: $\frac{1}{2} = 0.\overset{\curvearrowright}{50}$ = $\boxed{50\%}$

Part ⓒ : $\frac{7}{2}$

Answer: $\frac{7}{2} = 3.\overset{\curvearrowright}{5}$ = $\boxed{350\%}$

Example 3 | Convert the following to decimals/fractions:

Part ⓐ : 92%

Answer: $92\% = \frac{92}{100}$ = $\boxed{0.92}$

Part ⓑ : $\frac{1}{2}\%$

Answer: $\frac{1}{2}\% = \frac{1/2}{100} = \frac{0.5}{100}$ = $\boxed{0.005}$

Part ⓒ : -0.92%

Answer: $-0.92\% = \frac{-0.92}{100}$ = $\boxed{-0.0092}$

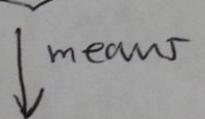* How to translate percents and how to solve them?

Answer:

We need to know the following <u>common words</u>:

1- "Of" $\xrightarrow{\text{means}}$ multiplication: "." or "x"

2- "is" $\xrightarrow{\text{means}}$ equal to: "$=$"

3- "what Percent" or "What number"

$\downarrow$ means

Something we need to find "<u>variable</u>"

say lik x, y, or any other letters

4- "%" $\xrightarrow{\text{means}}$ "Part of 100" or "multiply by $\frac{1}{100}$"

$\boxed{\times 0.01}$ or $\boxed{\times \frac{1}{100}}$

Ex3| Translate the following and then solve:

$100 is what percent of 300?

Solution:

Step 1: Translate the above as follows:

$$100 = x \cdot 300$$

Step 2: Solve for x as we did in the previous lesson "Solving linear equations":

$$\frac{100}{300} = \frac{300x}{300} \Rightarrow \boxed{x = \frac{1}{3}}$$

Step 3: let's convert what we got from Step 2 to percents:

$$\frac{1}{3} \approx 0.33 \text{ or } \boxed{33\%}$$

Ex 4 | Mohammed went to land Rover Dealership to buy a <u>1997 land Rover Defender</u>. The price of this car was listed $90,000. A discount of 10% on the price of this car, followed by another discount of 5% because he is a math faculty in California, is equivalent to a single discount of what percent of the original price.

Solution: Original price is $90,000 then, apply discount 1 to get the following:

$$90,000 \times 10\% = 90,000 \times \frac{10}{100} = \boxed{\$9,000}$$

Now, Price after discount 1 is $90,000 - \$9,000 = \boxed{\$81,000}$

$$Final\ Price = \$81,000 - \left(81,000 \times \frac{5}{100}\right)$$
$$= \$81,000 - \$4050 = \boxed{\$76,950}$$

So, our final price is $\boxed{\$13,050}$ less then the orginal one. → ⑤

Hence, $\dfrac{\$13,050}{\$90,000} = 0.145$

or

$= \boxed{14.5\%} \leftarrow \boxed{\text{Final Answer}}$

Ex 5] Robin has a base salary of $2000 per month. She also receive a commission of 5% of her salary. Last month her total earnings were $2,750. Then, find what were the total sales for the month.

Solution: Assume that the total sale for the month is α. Then, we have:

$\underbrace{\text{Robin's Salary} + \text{Robin's Commission}}_{} = \text{Total Earnings}$

$2000 + 0.05\,\alpha = 2750$

$\Rightarrow 0.05\,\alpha = 2750 - 2000$

$\Rightarrow 0.05\,\alpha = 750$

$\Rightarrow \alpha = \dfrac{750}{0.05} = 15,000$

therefore, Robin's total sales for the month were $15,000.