

Percent Problems

① "of - is problems"

of -- multiplication

is -- equals

what number

what part

etc.

-- variable

Remember to convert
percents to decimals
and solve!

EX. 1.2 is 30% of what number?

$$\begin{array}{ccccccccc} & \downarrow & & \downarrow & & \downarrow & & \downarrow & & \downarrow \\ 1.2 & = & .3 & \cdot & & & & & & x \end{array}$$

$$1.2 = .3x$$

$$\frac{1.2}{.3} = \frac{\cancel{.3}x}{\cancel{.3}}$$

$$4 = x$$

2) Percent Increase/Decrease

$$\frac{\text{Percent Increase/Decrease}}{\text{decrease}} = \frac{\text{amount of increase/decrease}}{\text{original amount}}$$

Ex. Suppose you earn \$300 per week, and then it decreases by \$30. Find the percent of decrease

$$\begin{aligned} \% \text{ decrease} &= \frac{\text{amount of decrease}}{\text{original amount}} \\ &= \frac{\$30}{\$300} \\ &= .1 = 10\% \end{aligned}$$

Income decreased by 10%.

Ex. Last week a dress was \$1495. This week it increased to \$1705. What was the percent of increase?

$$\begin{aligned} \% \text{ increase} &= \frac{\text{amount of increase}}{\text{original amount}} \\ &= \frac{\$210}{\$1495} \\ &\approx .1405 \\ &\approx 14.1\% \end{aligned}$$

The dress increased by 14.1%.

✓ Sales Tax

$$\text{Sales tax} = \text{tax rate} \cdot \text{purchase price}$$

$$\text{total price} = \text{purchase price} + \text{sales tax.}$$

EX. A watch costs \$249 w/ 6.5% sales tax.
How much does it cost after tax?

$$\begin{aligned} \text{Sales tax} &= \text{tax rate} \cdot \text{purchase price} \\ &\quad \downarrow \qquad \qquad \downarrow \\ &\quad (.065) \cdot \quad \$249 \\ &= \$16.19 \end{aligned}$$

$$\begin{aligned} \text{total price} &= \text{tax} + \text{purchase price} \\ &\quad \downarrow \\ &= \$16.19 + \$249 \\ &= \$265.19 \end{aligned}$$

Remember
to round
money to nearest
cent!



④ Commission

$$\text{Commission} = \frac{\text{Commission Rate}}{\text{Rate}} \cdot \text{Sales}$$

Ex. A Knife-seller sold 143 sets of knives last week, at a commission rate of \$10.40 per set. How much commission does he make on his check?

$$\begin{aligned} \text{commission} &= \text{rate} \cdot \text{Sales} \\ &\quad \downarrow \qquad \qquad \downarrow \\ &\quad \$10.40 \cdot 143 \\ &= \$1487.20 \end{aligned}$$

⑤ Discounts

$$\frac{\text{amount of discount}}{\text{discount}} = \frac{\text{discount rate}}{\text{Rate}} \cdot \frac{\text{original price}}{\text{price}}$$

$$\text{sale price} = \text{original price} - \text{amount of discount}$$

Ex. A Balenciaga bag is 15% off b/c you know the store ~~manager~~ manager (yeah right!). Find the sale price if it originally for \$2195.

~~amt~~

$$\begin{aligned}
 \text{amount of discount} &= \text{discount rate} \cdot \text{original price} \\
 &= .15 \cdot \$2195 \\
 &= \$329.25
 \end{aligned}$$

$$\begin{aligned}
 \text{sale price} &= \text{original price} - \text{amount of discount} \\
 &= \$2195 - \$329.25 \\
 &= \$1865.75
 \end{aligned}$$

⑥ Interest

Simple interest

$$I = P \cdot R \cdot T$$

principal \swarrow \downarrow Rate \searrow time in years.

Compound interest

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

principal \downarrow $\frac{r}{n}$ \swarrow Rate \searrow # of times compounded per year \downarrow time in years

Simple Interest

Ex. A student borrows \$1500 for 9 months on a credit card, w/ an interest rate of 20%. How much is the interest?

$$\begin{aligned} I &= PRT \\ &= (\$1500) (.2) \left(\frac{3}{4}\right) \\ &= \$225. \end{aligned}$$

$$9 \text{ months} = \frac{3}{4} \text{ year}$$

Compound Interest

$$\begin{aligned} A &= P \left(1 + \frac{r}{n}\right)^{nt} \\ &= (\$3000) \left(1 + \frac{.04}{1}\right)^{1 \cdot 6} \\ &= \$3,795.96. \end{aligned}$$

\$3000 is invested at 4% interest compounded annually. Find the total amount after 6 years.

Compounded annually means once per year.

$$\text{So } n = 1.$$