

PERCENTS

A percent is a ratio out of 100.
100% represents the whole.

Percent Change:

A percent change represents an increase or a decrease from one number to another. It is found using the fraction: $\frac{\text{amount of change}}{\text{original number}}$

Change means subtract the greater number minus the smaller number in the numerator and put it over the original number. Convert the fraction into a percent.

To convert a fraction into a percent, $\frac{\text{part}}{\text{whole(total)}}$ convert the fraction to out of 100 if you have a friendly denominator (reduce fractions to help when possible). If not, divide the numerator by the denominator (numerator IN THE BOX).

Example: Find the percent change from 3 to 5:

$$\frac{5-3}{5} = \frac{2}{5} = \frac{40}{100} = 40\%$$

To turn the decimal into a percent, move the decimal to the right two places. Ex: $.45 = 45\%$

To turn a percent into a decimal, move the decimal to the left two places. Ex: $4\% = .04$

A percent **OF** a number is a **multiplication**.

Example: 15% of $20 \rightarrow 20(.15) = 3$

Estimate percents using 10% (move the decimal to the left once), 25% ($\frac{1}{4}$), 50% (half), to confirm your answer makes sense.

Writing percent expressions:

The original unknown amount is your variable. Ex: x

Convert the percent into a decimal. Ex: $25\% = .25$

Write the markup/down as a multiplication of the original unknown amount. Ex: $.25x$

If it is a **markup, add** it to the original. If it is a **markdown, subtract** it from the original. Simplify to get a second expression (+ or -). Remember there is a secret invisible 1 in front of the x (representing 100%). You can then plug in values of x into the expression to find the final value.

Examples:

A markup of 45%: $x + .45x$, $1.45x$

A markup represents an amount over 100%.

$1.45 = 145\%$

A markdown of 20%: $x - .2x$, $.8x$

A markdown represents an amount under 100%.

$.8 = 80\%$

Sales/Discounts/Markdowns Examples:

If you get ___ off...	You pay 100% - ___
25%	75%
20%	80%
35%	65%
40%	60%

PERCENT APPLICATIONS

Types Of Markups (+)	Types of Markdowns (-)
Tax Tip Commission (w/salary) Interest Shipping and Handling Percent Increase	Sale/Discount Percent Decrease

Solving Percent Problems (finding the **total** amount)

Method 1	Method 2
<p>Step 1: Convert the percent into a decimal</p> <p>Step 2: Multiply the decimal by the original amount</p> <p>Step 3: (Check the list above) If it is a type of markup, add it to the original. If it is a type of markdown, subtract it from the original</p>	<p>Step 1: (Check the list above) If it is a type of markup, add, or if it is a type of markdown, subtract, the percent with 100%</p> <p>Step 2: Convert the percent into a decimal</p> <p>Step 3: Multiply the decimal by the original amount</p>

Examples using Method 1:

1) Tax is 8%. You buy a sweater for \$40. What is the tax? What is the total price?

$$\text{Tax: } (.08)(40) = \$3.20 \quad \text{Total: } 40 + 3.20 = \$43.20$$

2) A TV is on sale for 15% off. The TV costs \$500. What is the discount? What is the total price?

$$\text{Discount: } (.15)(500) = \$75 \quad \text{Total: } 500 - 75 = \$425$$

3) You deposit \$1,000 into a savings account earning 5% simple interest each year. What is the total balance in the account after 3 years?

$$\text{Interest (one year): } (.05)(1000) = \$50$$

$$\text{*Interest (three years): } 50(3) = \$150$$

$$\text{Total balance after three years: } 1000 + 150 = \$1150$$

4) Your meal at a restaurant cost \$55. You want to leave a 20% tip. What is the tip? What is the total amount?

$$\text{Tip: } (.2)(55) = \$11 \quad \text{Total: } 55 + 11 = \$66$$