

# SOLVING PERCENT PROBLEMS

Percent (%) means “divided by 100.” Whenever you see a number with “percent” (%) after it, just divide it by 100.

$$20 \text{ percent} = 20/100 = 0.2$$

$$150\% = 150/100 = 1.5$$

$$\frac{2}{5}\% = 0.4\% = 0.4/100 = 0.004$$

To solve a percent problem, follow these steps:

1) Set up an equation using this chart.

<i>what or what number</i>	$x$
<i>what percent</i>	$\frac{x}{100}$
<i>is</i>	$=$
<i>of</i>	$\cdot$

2) Solve the equation for  $x$ .

## Examples

<p>1) <math>\overbrace{\text{What}}^x \text{ is } \overbrace{20\%}^{20/100 = 0.2} \text{ of } \overbrace{80}^8?</math></p> $x = 0.2 \cdot 80$ $x = 16$ <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">16</div>	<p>2) <math>\overbrace{\text{What percent}}^{\frac{x}{100}} \text{ of } \overbrace{20}^2 \text{ is } \overbrace{5}^5?</math></p> $\frac{x}{100} \cdot 20 = 5$ $\frac{x}{100} \cdot \frac{20}{1} = 5$ $\frac{20x}{100} = \frac{5}{1}$ $\frac{20x}{20} = \frac{500}{20}$ $x = 25$ <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">25%</div>
<p>3) <math>\overbrace{80}^8 \text{ is } \overbrace{40\%}^{40/100 = 0.4} \text{ of } \overbrace{\text{what number}}^x?</math></p> $80 = 0.4 \cdot x$ $\frac{80}{0.4} = \frac{0.4x}{0.4}$ $x = 200$ <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">200</div>	<p>4) Carlos works at a computer store. He earns a 4% commission on all his sales. What amount must he sell for his commission to be \$200. [\$200 is 4% of what amount?]</p> $200 = 0.04 \cdot x$ $\frac{200}{0.04} = \frac{0.04x}{0.04}$ $x = 5000$ <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">\$5000</div>

# Percent of Change

(use for percent increase/percent decrease/percent of discount/percent of error)

Use the formula:

$$\% = \frac{\text{amount of change}}{\text{original amount}} \cdot 100$$

← big # – small #

## Examples

<p>1) A pair of sneakers that regularly sells for \$35 is on sale for \$28. What is the percent of the discount?</p> $\% = \frac{35 - 28}{35} \cdot 100$ $\% = \frac{7}{35} \cdot \frac{100}{1}$ $\% = \frac{700}{35}$ $\% = 20$ <p style="text-align: right;"><span style="border: 1px solid black; padding: 2px;">20%</span></p>	<p>2) José weighs exactly 148.5 pounds. When José weighs himself on a defective scale, his weight is shown as 155.0 pounds. What is the percent of error of the defective scale to the <i>nearest tenth</i>?</p> $\% = \frac{155.0 - 148.5}{148.5} \cdot 100$ $\% = \frac{6.5}{148.5} \cdot \frac{100}{1}$ $\% = \frac{650}{148.5} \approx 4.4$ <p style="text-align: right;"><span style="border: 1px solid black; padding: 2px;">4.4%</span></p>
<p>3) There were 75 members of the Drama Club last year, but there are only 65 members this year. Find the percent of decrease to the <i>nearest hundredth</i>.</p> $\% = \frac{75 - 65}{75} \cdot 100$ $\% = \frac{10}{75} \cdot \frac{100}{1}$ $\% = \frac{1000}{75} \approx 13.33$ <p style="text-align: right;"><span style="border: 1px solid black; padding: 2px;">13.33%</span></p>	<p>4) Keyla's employer has promised her a 20% pay increase. She presently earns \$5 per hour. What will be her new hourly pay after the increase?</p> <p>Let <math>x</math> represent the new hourly pay.</p> $\% = \frac{\text{amount of change}}{\text{original amount}} \cdot 100$ $20 = \frac{x - 5}{5} \cdot \frac{100}{1}$ $\frac{20}{1} = \frac{100(x - 5)}{5}$ $100 = 100x - 500$ $\begin{array}{r} + 500 \qquad \qquad + 500 \\ \hline 600 = 100x \\ 100 \quad 100 \end{array}$ $6 = x$ <p style="text-align: right;"><span style="border: 1px solid black; padding: 2px;">\$6 per hour</span></p>