3.7 Solve Percent Problems

Goal • Solve percent problems.

Your Notes

> ### SOLVING PERCENT PROBLEMS USING PROPORTIONS
>
> You can represent "*a* is *p* percent of *b*" by using the proportion
>
> $$\frac{a}{b} = \frac{p}{\boxed{100}}$$
>
> where *a* is a part of the base __*b*__ and $\frac{p}{\boxed{100}}$, or *p*%, is the __percent__ .

Example 1   *Find a percent using a proportion*

What percent of 50 is 33?

Solution

Write a proportion when 50 is the base and 33 is part of the base.

$$\frac{a}{b} = \frac{p}{100}$$ **Write proportion.**

$$\frac{\boxed{33}}{\boxed{50}} = \frac{p}{100}$$ **Substitute __33__ for *a* and __50__ for *b*.**

$$\underline{3300} = 50p$$ **Cross products property**

$$\underline{66} = p$$ **Divide each side by __50__ .**

33 is __66%__ of 50.

✔ *Checkpoint* **Use a proportion to answer the question.**

1. What percent of 80 is 28?

35%

_____

2. What percent of 90 is 36?

40%

THE PERCENT EQUATION

You can represent "*a* is *p* percent of *b*" by using the equation:

$a = \underline{p\%} \cdot b$

where *a* is a part of the base $\underline{b}$ and *p*% is the $\underline{percent}$.

Example 2   *Find a percent using the percent equation*

What percent of 224 is 98?

The percent equation, $a = p\% \cdot b$, is derived from the proportion, $\dfrac{a}{b} = \dfrac{p}{100}$.

Solution

$a = p\% \cdot b$	**Write percent equation.**
$\underline{98} = p\% \cdot \underline{224}$	**Substitute** $\underline{98}$ **for** *a* **and** $\underline{224}$ **for** *b*.
$\underline{0.4375} = p\%$	**Divide each side by** $\underline{224}$.
$\underline{43.75\%} = p\%$	**Write decimal as a percent.**

98 is $\underline{43.75\%}$ of 224.

CHECK

$\underline{98} = p\% \cdot \underline{224}$	**Write original equation.**
$\underline{98} \stackrel{?}{=} \underline{0.4375} \cdot \underline{224}$	**Substitute** $\underline{0.4375}$ **for** *p*%.
$\underline{98} = \underline{98}$ ✓	**Multiply. Solution checks.**

Example 3 *Find a part of a base using the percent equation*

What number is 75% of 164?

Solution

$a = p\% \cdot b$			Write percent equation.
$= $ _75%_ $\cdot$ _164_			Substitute _75_ for p and _164_ for b.
$= $ _0.75_ $\cdot$ _164_			Write percent as a decimal.
$= $ _123_			Multiply.

_123_ is 75% of 164.

✔ *Checkpoint* **Use the percent equation to answer the question.**

3. What percent of 76 is 57?

75%

4. What number is 35% of 80?

28

Example 4 *Find a base using the percent equation*

21 is 37.5% of what number?

Solution

$a = p\% \cdot b$		Write percent equation.
_21_ $=$ _37.5%_ $\cdot b$		Substitute _21_ for a and _37.5_ for p.
_21_ $=$ _0.375_ $\cdot b$		Write percent as a decimal.
_56_ $= b$		Divide each side by _0.375_ .

21 is 75% of _56_ .

✔ *Checkpoint* **Use the percent equation to answer the question.**

5. 27 is 25% of what number?

108

6. 78 is 150% of what number?

52

TYPES OF PERCENT PROBLEMS

Percent Problem	Example	Equation
Find a percent.	What percent of 252 is 84?	$\underline{84} = p\% \cdot \underline{252}$
Find part of a base.	What number is 30% of 90?	$a = \underline{30\%} \cdot \underline{90}$
Find a base.	16 is 20% of what number?	$16 = \underline{20\%} \cdot b$

Homework