Chapter 2 Extension Lesson #1: Percent Problems

percent means "per hundred"

Example 1

Change $\frac{17}{20}$ to a percent.

$$\frac{17}{20} \cdot \frac{5}{5} = \frac{p}{100}$$

$$\frac{20p}{20} = \frac{1700}{20}$$

$$\boxed{p = 85\%}$$

$$20 \overline{\smash{)}17.00} \quad .85 \rightarrow \boxed{85\%}$$
$$\underline{-160} \downarrow$$
$$100$$
$$\underline{-100}$$
$$0$$

PERCENT PROPORTION

$$\frac{is}{of} = \frac{p}{100}$$

or

$$\frac{part}{whole} = \frac{p}{100}$$

Example 2

Fifty is what percent of 400?

p will be a decimal
↓
change to a %

Method 1 (Proportion)

$p = ?$ $is = 50$ $of = 400$

$$\frac{50}{400} = \frac{p}{100}$$

$$\frac{400p}{400} = \frac{5000}{400}$$

$$\boxed{p = 12.5\%}$$

Method 2 (Equation)

$$\frac{50}{400} = \frac{p \cdot 400}{400}$$

$$.125 = p$$

$$\boxed{12.5\% = p}$$

Example 3

What number is 36% of 150?

Change % into a decimal.

Method 1 (Proportion)

$p = 36$ $is = x$ $of = 150$

$$\frac{x}{150} = \frac{36}{100}$$

$$\frac{5400}{100} = \frac{100x}{100}$$

$$\boxed{54 = x}$$

Method 2 (Equation)

$$x = .36 \cdot 150$$

$$\boxed{x = 54}$$

Example 4

40% of what number is 30?   *mult*

Method 1 (Proportion)	Method 2 (Equation)
$p=40$ $is=30$ $of=x$	$\dfrac{.40 \cdot x}{.40} = \dfrac{30}{.40}$
$\dfrac{30}{x} = \dfrac{40}{100}$	$\boxed{x = 75}$
$\dfrac{40x}{40} = \dfrac{3000}{40}$	
$\boxed{75 = x}$	

Example 5

Find 18% of 46.   What is 18% of 46?   *mult*

Method 1 (Proportion)	Method 2 (Equation)
$p=18$ $is=x$ $of=46$	$x = .18 \cdot 46$
$\dfrac{x}{46} = \dfrac{18}{100}$	$\boxed{x = 8.28}$
$\dfrac{100x}{100} = \dfrac{828}{100}$	
$\boxed{x = 8.28}$	

Example 6

Faith bought a stereo that usually sells for $220. ~whole~
She received a 20% discount. ~p = 20~ How much did
she pay for the stereo? ~taking $ off~

What is 20% of $220? ~mult~

Method 1 (Proportion)	Method 2 (Equation)
$p = 20$ whole $= 220$ part $= x$ $\dfrac{x}{220} = \dfrac{20}{100}$ $\dfrac{100x}{100} = \dfrac{4400}{100}$ $x = \$44 \leftarrow$ discount $\begin{array}{r}\$220 \\ -\ 44 \\ \hline \$176\end{array}$	$x = .20 \cdot 220$ $x = 44 \leftarrow$ discount $\begin{array}{r}\$220 \\ -\ 44 \\ \hline \$176\end{array}$

Example 7

John scored 85% on the last test. He answered
34 questions correctly. How many questions
were on the test?

34 is 85% of what? ~mult~

Method 1 (Proportion)	Method 2 (Equation)
$p = 85$ part $= 34$ whole $= x$ $\dfrac{34}{x} = \dfrac{85}{100}$ $\dfrac{85x}{85} = \dfrac{3400}{85}$ $\boxed{x = 40 \text{ questions}}$	$\dfrac{34}{.85} = \dfrac{.85 \cdot x}{.85}$ $\boxed{40 \text{ questions} = x}$