

Section 10-1: Percents & Proportions

Objectives:

- **Solve problems involving percents by using a proportion or by writing an equation.**
- **Translate words into mathematical symbols.**

Convert Decimals to Percents or Percents to Decimals:

$$25\% = 0.25$$

$$0.821 = 82.1\%$$

$$90\% = 0.9$$

$$0.5 = 50\%$$

$$2\% = 0.02$$

$$0.07 = 7\%$$

$$140\% = 1.4$$

$$2.384 = 238.4\%$$

3 Methods to Solve:

1. Proportion
2. Equation
3. 10% Rule

Proportion:

$$\frac{\text{Part}}{\text{Whole}} = \frac{\%}{100} \quad \text{or} \quad \frac{\text{is}}{\text{of}} = \frac{\%}{100}$$

Ex 1:

20 is 40% of what number?

$$\frac{\text{Part}}{\text{Whole}} = \frac{\%}{100}$$

$$\frac{20}{x} \swarrow \nearrow \frac{40\%}{100}$$

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100}$$

$$\frac{2000}{40} = \frac{40x}{40}$$

$$\textcircled{50 = x}$$

Equation Method:

"of" means multiply

"is" means =

write %'s as decimals

Ex 2:

80% of what # is 94?

$$0.8 \overset{\text{Mult.}}{\times} x = 94$$

~~$0.8x = 94$~~

$$x = 117.5$$

Ex 3:

24 is what % of 30?

$$\frac{24}{30} = \frac{X\%}{100}$$

$$\frac{2400}{30} = \frac{30X}{30}$$

$$80\% = X$$

$$\frac{24}{30} = X \left(\frac{30}{30} \right)$$

$$0.8 = X$$

$$80\%$$

10% Rule:

If you can, break the % into 10's

Ex 4:

Find 40% of 50.

$$10\% \text{ of } 50 = 5$$

$$20\% \text{ of } 50 = 10$$

$$30\% \text{ of } 50 = 15$$

$$40\% \text{ of } 50 = 20$$

$$10\% \text{ of } 50 \text{ is } 5$$

$$40\% \text{ of } 50 \text{ is } 20$$

1. 25% of 176 is what number?

$$.25(176) = x$$

$$44 = x$$

2. Find 90% of 20.

$$.9(20) = x$$

$$18 = x$$

$$\frac{x}{20} = \frac{90\%}{100}$$
$$\frac{100x}{100} = \frac{1800}{100}$$
$$x = 18$$

3. 24 is what percent of 30?

$$\frac{24}{30} = \frac{x(30)}{30}$$

$$x = 0.8 = 80\%$$

4. 80% of what number is 94?

$$.8(x) = 94$$

Screen Clipping

$$\frac{94}{x} = \frac{80\%}{100}$$

5. What is 60% of 45?

$$x = .6(45)$$

6. 9 is what percent of 30?

$$9 = x(30)$$

15. Jonas and Linda's restaurant bill comes to \$23.40. They are planning to tip the waiter 15% of their bill. How much money should they leave for a tip?

Part
whole

$$\frac{x}{23.40} = \frac{15\%}{100} \rightarrow \frac{100x}{100} = \frac{351}{100}$$

$x = 3.51$

16. The Briarwood Middle School chess club has 55 members. 22 of the members are in 7th grade. What percent of the members of the chess club are in 7th grade?

$$\frac{22}{55} = \frac{x}{100}$$

17. In the city of Springfield, 75% of the parks have tennis courts. If 15 parks have tennis courts, how many parks does Springfield have all together?

$$\frac{15}{x} = \frac{75\%}{100}$$

18. There are 225 students in 8th grade at Jefferson Middle School. A survey shows that 64% of them are planning to attend college. How many Jefferson 8th grade students are planning to attend college?

$$\frac{x}{225} = \frac{64\%}{100}$$