

Date: _____

KEY

2.3 Proportional Reasoning

Jerry is able to type 86 words in 4 minutes. How many words do you think he might be able to type in 11 minutes?

$$\frac{86 \text{ words}}{4 \text{ min}} = \frac{\square \text{ words}}{11 \text{ minutes}}$$

Proportion: a mathematical statement equating two fractions.

Ex 1 $\frac{3}{6} = \frac{1}{2}$

Ex 2 $\frac{12}{25} = \frac{x}{50}$

There are two ways to solve problems using proportional reasoning:

A box of granola bars costs \$9.96 for 12. How much would 4 granola bars cost?

1. Using rate

Step 1 - Find Unit Rate

$$\frac{\$9.96}{12 \text{ bars}} = \$0.83/\text{bar}$$

Step 2 - Multiply by unit rate

$$4 \text{ bars} \times \$0.83/\text{bar} = \boxed{\$3.32}$$

2. Using a proportion

$$\frac{\$9.96}{12 \text{ bars}} = \frac{x}{4 \text{ bars}}$$

$$\frac{\$0.83}{\text{bar}} = \frac{x}{4 \text{ bars}}$$

$$\times 4 \qquad \times 4$$

$$\boxed{\$3.32 = x}$$

Show you know:

Lamont buys 8 buckets of Fried Chicken for his party. They contain a total of 96 pieces of chicken. How many pieces would he find if he counted only 2 buckets? Which method did you use to find the answer? $\rightarrow x$

$$\frac{8 \text{ buckets}}{96 \text{ pieces}} = \frac{2 \text{ buckets}}{x \text{ pieces}}$$

$$x = 96 \div 4$$

$$\boxed{x = 24 \text{ pieces}}$$

Solving Ratio Problems Using Proportions

Example:

A wildlife biologist wants to know how many trout are in a slough in Saskatchewan. He captures and tags 24 trout and releases them back into the slough. Two weeks later, he returns and captures 30 trout and finds that 5 of them are tagged. He uses the following ratios to estimate the number of fish in the slough:

total recaptured

captured & tagged

recaptured with tags

$$\frac{\text{fish recaptured with tags}}{\text{total fish recaptured}} = \frac{\text{fish caught and tagged}}{\text{total fish in slough}}$$

$$\frac{5}{30} = \frac{24}{x}$$

(Note: 24 ÷ 5 = 4.8)

$$x = 30 \times 4.8$$

$$x = 144$$

$$24 \div 5 = 4.8$$

USING LOWEST TERMS

$$\frac{5}{30} = \frac{24}{x}$$

(Note: 5 and 30 are divided by 5)

$$\frac{1}{6} = \frac{24}{x}$$

$$x = 6 \times 24$$

$$x = 144$$

You should try to convert your first ratio to lowest terms.

Example:

4 erasers cost 75¢. How much will a dozen erasers cost?

$$\frac{4}{75¢} = \frac{12}{x}$$

(Note: 12 ÷ 4 = 3)

$$x = 75¢ \times 3$$

$$x = 225¢$$

$$x = \$2.25$$

Sometimes you can't convert to lowest terms.

Examples: Sales discounts and promotions

DON'T DO THIS!

1) Evan is an event planner. He has saved to buy an \$800 suit for work. A department store offers this sales promotion. "Get our credit card, and get 25% off your first purchase!" Evan got the card and bought the suit. How much did Evan save?