Name: Math 8 Date:

Chapter 7: Ratios, Rates, and Proportions
CH 7.3 - Proportional reasoning

Proportion:

- **A statement that says two RATIOS or two RATES are EQUIVALENT**
- **Can be written as an EQUATION with two FRACTIONS**

Ex. $\frac{1}{2} = \frac{3}{6}$ $\qquad \frac{120\text{km}}{2\text{hr}} = \frac{360\text{km}}{6\text{ hrs}}$

Proportional Relationship:

- **A relationship in which one QUANTITY is always related to another by a constant MULTIPLIER**

Ex. $\frac{80\text{km}}{1\text{hr}} = \frac{320\text{km}}{4\text{ hrs}}$ (×4 from 80km to 320km; ×4 from 1hr to 4 hrs)

Using proportional reasoning with rates

Problem: Sam paints $15m^2$ of his fence in 3 hours. The total area that he needs to paint is $90m^2$ If he continues at that same rate how long will it take him to paint his entire fence?

$\frac{\text{area}}{\text{time}} = \frac{15m^2}{3\text{hrs}} = \frac{90m^2}{x}$ (÷ 15m² and 3hrs; × 3hrs)

$90 \times 3 = 270$

$270 \div 15 = 18\text{hrs}.$

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Using proportional reasoning with ratios

Problem: Packaged food sold in Canada must have a nutritional label on it. This is a label for a package of crackers.

A. How many grams of crackers contain 15 g of fiber?

$\frac{\text{g of crackers}}{\text{g of fiber}} = \frac{28\text{g}}{4\text{g}} = \frac{x}{15\text{g}}$

$28\text{g} \times 15\text{g} = 420$ $\quad 420 \div 4 = 105\text{g}$ of crackers.

Nutrition Facts

Serving Size 8 (28g)

Amount Per Serving	
Calories 100	
	% Daily Values*
Total Fat 5g	8%
Saturated Fat 0g	0%
Trans Fat 0g	
Sodium 180mg	8%
Total Carbohydrate 19g	6%
Dietary Fiber 4g	16%
Sugars 3g	
Protein 2g	4%

*Percent Daily Values are based on a 2,000 calorie diet.

B. If you eat 75 crackers how many grams of fat will you have consumed?

$\frac{\text{crackers}}{\text{g of fat}} = \frac{8}{5\text{g}} = \frac{75}{x}$

$75 \times 5 = 375$

$375 \div 8 = 46.88\text{g}$ of fat in 75 crackers.

Analyzing and identifying a relationship as proportional

Problem: Daniel scored 20 points in his first 8 basketball games. He scored 55 points in his remaining 22 games. Is this a proportional relationship?

Method 1: Compare unit rates

$\frac{\text{points}}{\text{games}}$ $\quad \frac{20\text{pts}}{8\text{ games}} = 2.5\text{ pts per game}$ $\quad \frac{55\text{pts}}{22\text{ games}} = 2.5\text{ pts per game}$.

★ Same unit rate therefore this is a proportional relationship

Method 2: Compare ratio of pts : pts. and games : games.

$\frac{20\text{pts}}{55\text{pts}} = 0.36$ $\quad \frac{8\text{ games}}{22\text{ games}} = 0.36$

★ Same ratio therefore proportional.

Method 3: Cross multiply.

$\frac{20\text{pts}}{8\text{ games}} = \frac{55\text{pts}}{22\text{ games}}$ $\quad 8 \times 55 = 440$ $\quad 20 \times 22 = 440$ } proportional

Practice assignment - page 245 # 1, 2, 4, 5, 8, choose two apply questions