Homework

Unit 3 · Lesson 10: Proportional Relationships: Write Equations

Name: _____

Date: _____

Objective: *I will write equations to solve problems involving proportional relationships.*

Vocabulary

Equations: two expressions of equal value separated by an equal sign

2 + 8 = 3 + 5 +2

Proportional Relationship: a relationship between two equal ratios

Written form is ***y = kx***; where ***k*** is constant, using the ordered data pairs (*x*, *y*)

Inverse Operations: operations that undo each other; the opposite operation

Addition ⟷ *Subtraction*

Multiplication ⟷ *Division*

Example:

$$5x = 2$$

$$\frac{5x}{5} = \frac{2}{5}$$

$$x = \frac{2}{5}$$

Steps:

1. Rewrite the situation as an equation with variables.
2. Find the unit rates using the inverse operation.
3. Determine which unit rate to use.
4. Multiply both sides of the equation by the required amount.

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Examples

Directions: Write each situation as an equation. Find the unit rate and solve.

14 bagels can be covered by 6 tablespoons of cream cheese. How many bagels would 10 tablespoons of cream cheese cover?

Solution:

- Step 1 – Rewrite the situation as an equation: $14b = 6c$ where b = bagels and c = tablespoons of cream cheese
- Step 2 – Find the unit rates: $b = \frac{6}{14}c$ and $c = \frac{14}{6}b \rightarrow c = 2\frac{1}{3}b$
- Step 3 – Determine which unit rate to use: We will use the unit rate $c = 2\frac{1}{3}b$, because we are trying to identify how many bagels 10 tablespoons of cream cheese will cover.
- Step 4 – Multiply both sides of the equation: $(10 \times c) = \left(2\frac{1}{3}b \times 10\right) \rightarrow 10c = 23\frac{1}{3}b$

Answer: 10 tablespoons of cream cheese will cover $23\frac{1}{3}$ bagels.

You bike 47 kilometers in 5 hours. How many hours will it take you to cover 100 kilometers?

Solution:

- Step 1 – Rewrite the situation as an equation: $47k = 5h$ where k = kilometers and h = hours
- Step 2 – Find the unit rates: $k = \frac{5}{47}h$ and $h = \frac{47}{5}k \rightarrow h = 9\frac{2}{5}k$.
- Step 3 – Determine which unit rate to use: We will use the unit rate $k = \frac{5}{47}h$ because we are trying to identify how many hours 100 kilometers will take to bike.
- Step 4 – Multiply both sides of the equation: $(100 \times k) = \left(\frac{5}{47}h \times 10\right) \rightarrow 100k = \frac{500}{47}k \rightarrow 100k = 10\frac{30}{47}h$.

Answer: 100 kilometers will take $10\frac{30}{47}$ hours to bike.

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Directions: Write each situation as an equation. Find the unit rate and solve.

1. 36 boards cover 15 ft^2. How many boards are needed to cover 100 ft^2?

   Equation:
   Unit Rate:
   Solution:

2. Two cups of chicken stock with $\frac{1}{4}$ cup of parsley. How much parsley would 25 cups of chicken stock need?

   Equation:
   Unit Rate:
   Solution:

3. There are 625 oranges in 25 trees. At this rate, how many oranges would be in 70 trees?

   Equation:
   Unit Rate:
   Solution:

4. Jake cleans his house 3 times in 6.5 weeks. How many times will he clean his house in 52 weeks?

   Equation:
   Unit Rate:
   Solution:

5. There are 40 grams of sugar in 12.5 cups of juice. How many grams of sugar are in 62 cups of juice?

   Equation:
   Unit Rate:
   Solution:

6. It takes 22.5 minutes to read 15 pages. How many pages can be read in 120 minutes?

   Equation:
   Unit Rate:
   Solution:

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Notes