

### 10-2: Applications of Proportions in the Real World

**Learning Target:** *I can solve real world problems using proportions.*

WARM UP:

Solve each proportion for the value of the variable.

1)  $\frac{5}{8} = \frac{n}{n-1}$   
 $5(n-1) = 8n$   
 $5n - 5 = 8n$   
 $-3n - 5 = 8n$   
 $-5 = 3n$   
 $\frac{-5}{3} = \frac{3n}{3}$   
 $n = -1.7$

2)  $\frac{a}{a+6} = \frac{10}{3}$   
 $10(a+6) = 3a$   
 $10a + 60 = 3a$   
 $10a - 10a + 60 = 3a - 10a$   
 $60 = -7a$   
 $\frac{60}{-7} = \frac{-7a}{-7}$   
 $a = -8.6$

Simplify to see if the ratios are proportional.

3)  $\frac{10}{12}$  and  $\frac{15}{36}$  **no**

4)  $\frac{36}{72} = \frac{9}{18}$   
**yes**  
 $a = -8.6$

**Proportions are frequently used to solve real world problems involving equivalent ratios.**

➤ RECALL:

- A **ratio** is a comparison of two numbers by division (a fraction).
- A **proportion** is an equation showing that 2 ratios are equal (equivalent fractions).

**Exercise 1-**

Kaylee baked 36 cookies with 3 scoops of flour. How many scoops of flour does Kaylee need in order to bake 48 cookies?

Step 1: Set up a word ratio with the units that are being compared.

$\frac{\text{COOKIES } 36}{\text{flour } 3} = \frac{48}{x}$

Step 2: Set up a proportion with the given data.

Step 3: Cross multiply to solve!

$x = 4 \text{ SCOOPS}$

$\frac{36x}{36} = \frac{144}{36}$

**Exercise 2- Sometimes data will be given in tables.**

Use the information provided to write and solve a proportion to find out how much 13 apps will cost.

	Last Month	This Month
Apps	2	13
Cost (\$)	\$6.50	?

$\frac{\text{APP } 2}{\$ 6.50} = \frac{13}{x}$   
 $2x = 84.5$   
 $\frac{2x}{2} = \frac{84.5}{2}$   
 $x = 42.25$

$\$ 42.25$

**Exercise 3- Try this...**

The rate at which water flows through a garden hose is constant. If a 4-gallon bucket is filled in 5 minutes, approximately how many gallons of water will flow from the hose in 45 minutes?

$\frac{\text{gal.}}{\text{min}} \quad \frac{4}{5} = \frac{x}{45}$

$\frac{5x}{5} = \frac{180}{5}$   
 $x = 36$

36 gallons

**Problem Set:**

1. Julian raked 3 bags of leaves in 36 minutes. If he continues to work at the same pace, about how long will it take him to rake 18 bags of leaves?

$$\frac{\text{bags}}{\text{min.}} \quad \frac{3}{36} = \frac{18}{x} \quad \boxed{x = 216 \text{ min}}$$

$$\frac{648}{3} = \frac{3x}{3}$$

2. Amy earned \$29.25 after babysitting for 3 hours. If she always charges the same rate, how much will she make if she babysits for a total of 17 hours this week?

$$\frac{\text{hours}}{\text{money}} \quad \frac{3 \text{ hrs}}{29.25} = \frac{17 \text{ hrs}}{x}$$

$$\frac{3x}{3} = \frac{497.25}{3}$$

$$\boxed{x = 165.75 \text{ hrs}}$$

3. A 2-month membership to the gym costs \$75. Jim would like to join the gym until he goes on vacation in 8 months. What is the total amount he will pay for 8 months of gym membership?

$$\frac{\text{month}}{\text{cost}} \quad \frac{2}{75} = \frac{8}{x}$$

$$\frac{2x}{2} = \frac{600}{2}$$

$$\boxed{x = 300}$$

4. Every day, Ms. Moser travels 4.6 miles from the high school to South Ocean Middle School. During this trip, her car uses 0.22 gallons of gas. How many gallons of gas does Ms. Moser's car use to make the 9.2-mile trip home?

$$\frac{\text{m}}{\text{g}} = \frac{4.6}{0.22} = \frac{9.2}{x} = 4.6x = 2.024$$

$$\begin{array}{r} 46 \quad | \quad 4.6 \\ \hline x = 0.449 \end{array}$$

5. Mary ran 2 miles in about 23 minutes. If she continued to run at the same pace, how long will it take her to run 10 miles?

6. Carlos took a trip to Argentina. The money used in Argentina is called the Peso. The exchange rate is 3 Pesos for \$1. How many Pesos would Carlos receive if he exchanged \$75 before his trip?

7. The table below gives information about the distance between Patchogue and Lake Grove on a map. The key on the map states that 1 cm on the map is equivalent to 3 miles in real life. How far apart in miles are Patchogue and Lake Grove?

	Scale	Real Life
mi.	3	?
cm.	1	2.9