

# Lesson 5.4:

# Solving Proportions

## 5.4 Notes

Get out your spiral notebooks and calculator!

## Essential Question

How can you solve proportions?

### Key Idea

#### Solving Proportions

**Method 1** Use mental math. (*Section 5.3*)

**Method 2** Use the Multiplication Property of Equality. (*Section 5.4*)

**Method 3** Use the Cross Products Property. (*Section 5.4*)

**Example 1:****Solve Proportions Using Multiplication**

$$\frac{5}{7} = \frac{x}{21}$$

$$\frac{5}{7} = \frac{x}{21} \quad x=15$$

Use multiplication to solve the proportion.

$$1. \frac{w}{6} = \frac{6}{9}$$

$$w=4$$

$$2. \frac{12}{10} = \frac{a}{15}$$

$$a=18$$

**Example 2:**

Solve Proportions Using the Cross Products Property.

a.  ~~$\frac{9}{y} = \frac{3}{17}$~~

$$3y = 9 \cdot 17$$

$$3y = 153$$

$$\begin{array}{r|l} \div 3 & \div 3 \\ \hline y & = 51 \end{array}$$

$$\begin{array}{r} 6 \quad 17 \\ \times 9 \\ \hline 153 \\ 3 \overline{)153} \\ \underline{-15} \phantom{3} \\ 0 \phantom{3} \\ \underline{-0} \\ 0 \end{array}$$

b.  ~~$\frac{5}{2} = \frac{d-2}{4}$~~

$$2(d-2) = 5 \cdot 4$$

$$2d - 4 = 20$$

$$\begin{array}{r|l} +4 & +4 \\ \hline 2d & = 24 \end{array}$$

$$2d = 24$$

$$\begin{array}{r|l} \div 2 & \div 2 \\ \hline d & = 12 \end{array}$$

$$d = 12$$

Use the Cross Products Property to solve the proportion.

3.  ~~$\frac{12}{5} = \frac{6}{y}$~~

$$12y = 5 \cdot 6$$

$$12y = 30$$

$$\begin{array}{r|l} \div 12 & \div 12 \\ \hline y & = 2.5 \end{array}$$

$$\begin{array}{r} 2.5 \\ 12 \overline{)30.0} \\ \underline{-24} \phantom{0} \\ 60 \\ \underline{-60} \\ 0 \end{array}$$

4.  ~~$\frac{40}{z+1} = \frac{15}{6}$~~

$$15(z+1) = 40 \cdot 6$$

$$15z + 15 = 240$$

$$\begin{array}{r|l} -15 & -15 \\ \hline 15z & = 225 \end{array}$$

$$15z = 225$$

$$\begin{array}{r|l} \div 15 & \div 15 \\ \hline z & = 15 \end{array}$$

$$z = 15$$

$$\begin{array}{r} 15 \\ 15 \overline{)225} \\ \underline{-15} \phantom{0} \\ 75 \\ \underline{-75} \\ 0 \end{array}$$

**Example 3:****Story Problem--Write a proportion first, then solve it.**

If 3 medium pizzas cost \$10.50, how much does it cost to buy 10 medium pizzas?

$$\frac{\$10.50}{3} = \frac{x}{10}$$

$$\begin{array}{r|l} 3x = \$105 & \\ \div 3 & \div 3 \\ \hline x = \$35 & \end{array}$$

**Story Problem--Write a proportion first, then solve it.**

5. It costs \$95 for 20 students to visit an aquarium. How much does it cost for 162 students?

$$\frac{\$95}{20} = \frac{x}{162}$$

$$\begin{array}{r|l} 20x = \$15,390 & \\ \div 20 & \div 20 \\ \hline x = \$769.50 & \end{array}$$