

Ratio and Proportion in Word Problems

Algebra Worksheet · Grade 6–9

Name: _____

Date: _____

Learning Objectives

- Write ratios in correct order using colon, fraction, and 'is to' notation
- Set up proportions from word problems and identify the unknown variable
- Solve for unknown values using cross multiplication

Problems

1. In a class of 30 students, 12 are boys. Write the ratio of girls to boys in three different ways.

2. There are 40 fruit in a basket, and 16 of them are oranges. What is the ratio of oranges to non-oranges?

3. Solve for x using cross multiplication.

$$\frac{x}{4} = \frac{15}{6}$$

4. Solve for x using cross multiplication.

$$\frac{9}{3} = \frac{x}{5}$$

5. A recipe calls for 3 cups of flour for every 2 cups of sugar. If a baker uses 12 cups of flour, how many cups of sugar are needed? Set up a proportion and solve for x.

$$\frac{3}{2} = \frac{12}{x}$$

6. A car travels 180 miles in 3 hours. At the same speed, how many miles will it travel in 7 hours? Set up a proportion and solve for x.

$$\frac{180}{3} = \frac{x}{7}$$

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7. Solve for x using cross multiplication.

$$\frac{7}{x} = \frac{14}{10}$$

8. In a school, the ratio of teachers to students is 2 to 45. If there are 360 students, how many teachers are there? Set up and solve a proportion.

$$\frac{2}{45} = \frac{x}{360}$$

9. A map uses a scale where 5 centimeters represents 200 kilometers. If two cities are 17.5 centimeters apart on the map, what is the actual distance between them in kilometers? Set up and solve a proportion.

$$\frac{5}{200} = \frac{17.5}{x}$$

10. A store sells 3 notebooks for every 5 pens it sells. In one week, the store sold a total of 480 items (notebooks and pens combined). How many notebooks and how many pens were sold? Use the ratio 3 : 5 to write expressions and solve.

$$\frac{3}{8} \times 480 = \text{notebooks}, \quad \frac{5}{8} \times 480 = \text{pens}$$

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Ratio and Proportion in Word Problems — Answer Key

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Answer Key

1. Answer: 18 : 12, 18/12, 18 to 12 (or simplified 3 : 2)

- Number of girls = $30 - 12 = 18$
 - Ratio of girls to boys: 18 : 12, or 18/12, or 18 to 12
 - Simplified: divide both by 6 $\rightarrow 3 : 2$
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2. Answer: 16 : 24, simplified 2 : 3

- Non-oranges = $40 - 16 = 24$
 - Ratio of oranges to non-oranges = 16 : 24
 - Simplify by dividing both by 8: 2 : 3
-

3. Answer: $x = 10$

- Cross multiply: $6 \times x = 4 \times 15$
 - $6x = 60$
 - Divide both sides by 6: $x = 10$
-

4. Answer: $x = 15$

- Cross multiply: $3 \times x = 9 \times 5$
 - $3x = 45$
 - Divide both sides by 3: $x = 15$
-

5. Answer: $x = 8$ cups of sugar

- Set up proportion: $\frac{3}{2} = \frac{12}{x}$
 - Cross multiply: $3 \times x = 2 \times 12$
 - $3x = 24$
 - Divide both sides by 3: $x = 8$
-

6. Answer: $x = 420$ miles

- Set up proportion: $\frac{180}{3} = \frac{x}{7}$
 - Cross multiply: $3 \times x = 180 \times 7$
 - $3x = 1260$
 - Divide both sides by 3: $x = 420$
-

7. Answer: $x = 5$

- Cross multiply: $7 \times 10 = 14 \times x$
 - $70 = 14x$
 - Divide both sides by 14: $x = 5$
-

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8. Answer: $x = 16$ teachers

- Set up proportion: $2/45 = x/360$
 - Cross multiply: $2 \times 360 = 45 \times x$
 - $720 = 45x$
 - Divide both sides by 45: $x = 16$
-

9. Answer: $x = 700$ km

- Set up proportion: $5/200 = 17.5/x$
 - Cross multiply: $5 \times x = 200 \times 17.5$
 - $5x = 3500$
 - Divide both sides by 5: $x = 700$
-

10. Answer: 180 notebooks and 300 pens

- The ratio of notebooks to pens is 3 : 5, so the total parts = $3 + 5 = 8$
 - Each part = $480 \div 8 = 60$ items
 - Notebooks = $3 \times 60 = 180$
 - Pens = $5 \times 60 = 300$
 - Check: $180 + 300 = 480$ ✓
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