

Geometry: Ratio and Proportion (Similarity)



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DIRECTIONS

Solve each problem. Simplify all answers. Show your work where applicable.

1 Simplify the ratio:

$$4 : 12$$

Answer: _____

2 Write as a fraction in lowest terms:

$$\frac{6}{14}$$

Answer: _____

3 Solve for x:

$$\frac{x}{2} = \frac{7}{7}$$

Answer: _____

4 Solve for x:

$$\frac{x + 14}{6} = \frac{6}{2}$$

Answer: _____

5 Similar triangles. Find x:

$$\frac{3}{6} = \frac{3}{x}$$

Answer: _____

6 Find the scale factor (small to large):

$$\text{Small side} = 4, \quad \text{Large side} = 8$$

Answer: _____

7 Similar figures. Find the perimeter of the larger figure:

$$\text{Scale factor} = 4, \quad P_{\text{small}} = 24$$

Answer: _____

8 Angles of a triangle are in ratio. Find each angle:

$$\text{Angles in ratio } 2 : 4 : 3$$

Answer: _____

9 Solve the proportion (map scale):

$$\frac{1 \text{ cm}}{40 \text{ km}} = \frac{5 \text{ cm}}{x}$$

Answer: _____

10 Similar polygons. Find x:

$$\frac{5}{10} = \frac{6}{x}$$

Answer: _____



Answer Key & Solutions

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TEACHER NOTES

Reinforce cross-multiplication for solving proportions. Emphasize that similar figures share the same scale factor for all corresponding sides.

1 Simplify the ratio:

$$4:12$$

$$= 2:6$$

GCD(4,12)=2. Divide both by 2.

2 Write as a fraction in lowest terms:

$$\frac{6}{14}$$

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

Divide numerator and denominator by GCD = 2.

3 Solve for x:

$$\frac{x}{2} = \frac{7}{7}$$

$$= x = 2$$

Cross multiply: $7x = 2 \times 7 = 14$, so $x = 14/7$.

4 Solve for x:

$$\frac{x+14}{6} = \frac{6}{2}$$

$$= x = 4$$

Cross multiply: $2(x+14) = 6 \times 6$. So $2x = 36 - 28 = 8$, $x = 4$.

5 Similar triangles. Find x:

$$\frac{3}{6} = \frac{3}{x}$$

$$= x = 6$$

Cross multiply: $3x = 3 \times 6 = 18$. So $x = 18/3 = 6$.

6 Find the scale factor (small to large):

Small side = 4, Large side = 8

$$= k = 2$$

Scale factor = large \div small = $8 \div 4 = 2$.

7 Similar figures. Find the perimeter of the larger figure:

Scale factor = 4, $P_{\text{small}} = 24$

$$= P_{\text{large}} = 96$$

Perimeter scales with the linear scale factor: $4 \times 24 = 96$.

8 Angles of a triangle are in ratio. Find each angle:

Angles in ratio 2 : 4 : 3

$$= 40^\circ, 80^\circ, 60^\circ$$

Sum = 180° . Unit = $180 \div (2+4+3) = 20^\circ$. Angles: $2 \times 20 = 40^\circ$, $4 \times 20 = 80^\circ$, $3 \times 20 = 60^\circ$.

9 Solve the proportion (map scale):

$$\frac{1 \text{ cm}}{40 \text{ km}} = \frac{5 \text{ cm}}{x}$$

$$= x = 200 \text{ km}$$

Cross multiply: $1x = 5 \times 40 = 200$. So $x = 200 \div 1 = 200 \text{ km}$.

10 Similar polygons. Find x:

$$\frac{5}{10} = \frac{6}{x}$$

$$= x = 12$$

Cross multiply: $5x = 6 \times 10 = 60$. $x = 60 \div 5 = 12$.

