

Solve each equation.

1. $\frac{3x}{8} = \frac{6}{x}$

$\frac{3x^2}{3} = \frac{48}{3}$

$\sqrt{x^2} = \sqrt{16}$

$x = \pm 4$

2. $\frac{7}{3} = \frac{x-4}{6}$

$42 = 3(x-4)$

$42 = 3x - 12$

$+12 \quad +12$

$\frac{54}{3} = \frac{3x}{3}$

$18 = x$

3. $\frac{x+9}{2} = \frac{3x-1}{8}$

$2(3x-1) = 8(x+9)$

$6x - 2 = 8x + 72$
 $-6x - 72 \quad -6x - 72$
 $-74 = 2x$

$\frac{-74}{2} = \frac{2x}{2}$
 $x = -37$

Proportions and Similarity

- 7-1** Ratios and Proportions
- 7-2** Similar Polygons
- 7-3** Similar Triangles
- 7-4** Parallel Lines and Proportional Parts
- 7-5** Parts of Similar Triangles
- 7-6** Similarity Transformations

7-1 Ratios and Proportions

Today you will: Write ratios and use properties of proportions

Content standard: G-SRT Similarity: Understand similarity in terms of similarity transformations

Ratios can be written **a to b** or **a : b** or $\frac{a}{b}$

Proportion $\frac{a}{b} = \frac{c}{d}$

cross $\frac{\text{ad}}{\text{bc}}$ = **products**

Extended Proportion: The expression $a:b:c$ means that the ratio of the first two quantities is $a:b$, the ratio of the last two quantities is $b:c$, and the ratio of the first and last quantities is $a:c$.

In a geometry class there are 18 girls and 12 boys.
What is the ratio of boys to girls?

$$\begin{array}{ccc} 12 & : & 18 \\ \div 6 & & \div 6 \end{array}$$

$$2 : 3$$

If the ratio of boys to girls is the same for the whole school and there are 2150 students in the school, how many girls are there in the school?

$$\text{boys} : \text{girls} = 2 : 3$$

$$2x : 3x \text{ girls}$$

$$2x + 3x = 2150$$

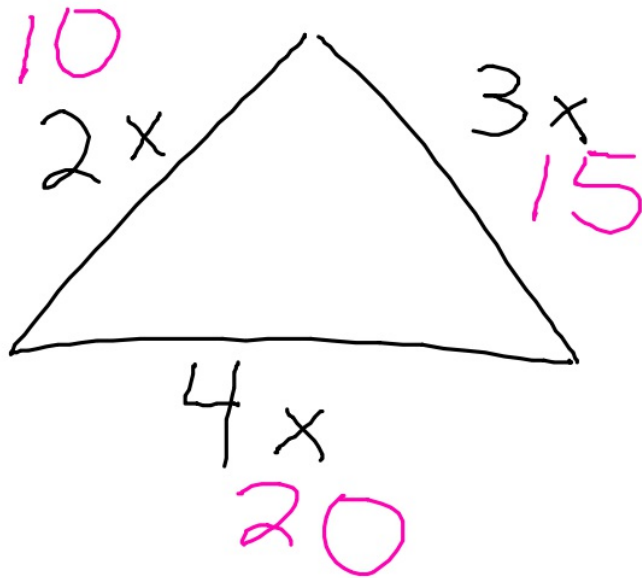
$$\frac{5x}{5} = \frac{2150}{5}$$

$$x = 430$$

$$430 \times 3$$

$$= 1290 \text{ girls}$$

If the ratio of the sides of a triangle with a perimeter of 45 are 2:3:4, what is the measure of each side?



$$2x + 3x + 4x = 45$$

$$\frac{9x}{9} = \frac{45}{9}$$

$$x = 5$$

Solve for x.

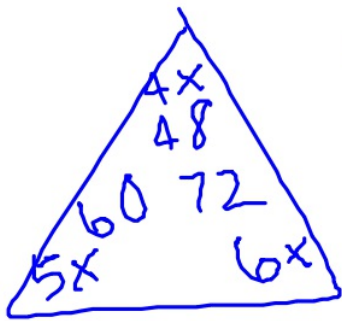
1. $\frac{2x + 3}{8} = \frac{5}{4}$

$$\begin{aligned} 8x + 12 &= 40 \\ -12 &\quad -12 \\ \hline 8x &= 28 \\ \frac{8x}{8} &= \frac{28}{8} \\ x &= 3\frac{1}{2} \end{aligned}$$

2. $\frac{x + 22}{x + 2} = \frac{30}{10}$

$$\begin{aligned} 30(x+2) &= 10(x+22) \\ 30x + 60 &= 10x + 220 \\ -10x &\quad -10x \\ \hline 20x + 60 &= 220 \\ -60 &\quad -60 \\ \hline 20x &= 160 \\ \frac{20x}{20} &= \frac{160}{20} \\ x &= 8 \end{aligned}$$

3. Find the measures of the angles in each triangle if the ratio of the measures of the angles is 4:5:6.



$$\begin{aligned}4x + 5x + 6x &= 180 \\15x &= 180 \\ \frac{15x}{15} &= \frac{180}{15} \\ x &= 12\end{aligned}$$

4. An artist in Portland, Oregon, makes bronze sculptures of dogs. The ratio of the height of a sculpture to the actual height of the dog is 2:3. If the height of the sculpture is 14 inches, find the height of the dog.

$\frac{\text{sculpture}}{\text{actual}}$

$$\frac{2}{3} = \frac{14}{x}$$

$$3(14) = 2x$$

$$42 = 2x$$

$$\frac{42}{2} = \frac{2x}{2}$$
$$x = 21 \text{ inches}$$

Assignment 7.1: pg 460-461 # 1-9, 17, 18

- PETS** Out of a survey of 1000 households, 460 had at least one dog or cat as a pet. What is the ratio of pet owners to households?
- SPORTS** Thirty girls tried out for 15 spots on the basketball team. What is the ratio of open spots to the number of girls competing?
- The ratio of the measures of three sides of a triangle is 2:5:4, and its perimeter is 165 units. Find the measure of each side of the triangle.
- The ratios of the measures of three angles of a triangle are 4:6:8. Find the measure of each angle of the triangle.

Solve each proportion.

5. $\frac{2}{3} = \frac{x}{24}$

6. $\frac{x}{5} = \frac{28}{100}$

7. $\frac{2.2}{x} = \frac{26.4}{96}$

8. $\frac{x-3}{3} = \frac{5}{8}$

- BAKING** Ella is baking apple muffins for the Student Council bake sale. The recipe that she is using calls for 2 eggs per dozen muffins, and she needs to make 108 muffins. How many eggs will she need?