4.6 Lesson

You can solve proportions using various methods.

Example 1 Solving a Proportion Using Mental Math

Solve
$$\frac{3}{2} = \frac{x}{8}$$
.

Step 1: Think: The product of 2 and what number is 8?

Step 2: Because the product of 2 and 4 is 8, multiply the numerator by 4 to find *x*.

$$\frac{3}{2} = \frac{x}{8}$$
$$2 \times ? = 8$$

The solution is x = 12.

$$3 \times 4 = 12$$

$$\frac{3}{2} = \frac{x}{8}$$

$$2 \times 4 = 8$$

Try It

Solve the proportion.

1.
$$\frac{5}{8} = \frac{20}{d}$$

d=32

$$2. \ \frac{7}{z_{*}^{2}} = \frac{14}{10}$$

2-5

3.
$$\frac{21}{24} = \frac{x}{8}$$

X=7

Example 2 Solving a Proportion Using Multiplication

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

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

Write the proportion.

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

Multiplication Property of Equality

$$15 = x$$

Simplify.

The solution is
$$x = 15$$
.

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Try It

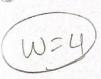
CVOSS Multiply then divide solve the proportion. by the # diagonal to variable

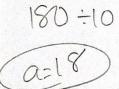
4.
$$\frac{w}{6} = \frac{6}{9}$$

5.
$$\frac{12}{10} = \frac{a}{15}$$

6.
$$\frac{y}{10} = \frac{3}{5}$$

6.6-36-9=4







Example 3 Solving a Proportion Using Cross Products

Solve each proportion.

a.
$$\frac{x}{8} = \frac{7}{10}$$

$$x \cdot 10 = 8 \cdot 7$$

Cross Products Property

$$10x = 56$$

Multiply.

$$x = 5.6$$

Divide each side by 10.

The solution is
$$x = 5.6$$
.

b.
$$\frac{9}{y} = \frac{3}{17}$$

$$9 \cdot 17 = y \cdot 3$$

Cross Products Property

$$153 = 3y$$

Multiply.

$$51 = y$$

Divide each side by 3.

The solution is
$$y = 51$$
.

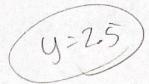


Solve the proportion. You do









8. $\frac{12}{5} = \frac{6}{y}$

9.
$$\frac{40}{z+1} = \frac{15}{6}$$

Example 4 Writing and Solving a Proportion

Find the value of x so that the ratios 3:8 and x:20 are equivalent.

For the ratios to be equivalent, the values of the ratios must be equal. So, find the value of x for which $\frac{3}{8}$ and $\frac{x}{20}$ are equal by solving a proportion.

$$\frac{3}{8} = \frac{x}{20}$$

Write a proportion.

$$20 \cdot \frac{3}{8} = 20 \cdot \frac{x}{20}$$

 $20 \cdot \frac{3}{8} = 20 \cdot \frac{x}{20}$ Multiplication Property of Equality

$$7.5 = x$$

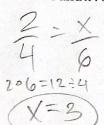
Simplify.

So, 3:8 and x: 20 are equivalent when x = 7.5.

Try It

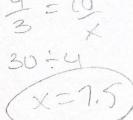
Find the value of x so that the ratios are equivalent.

10. 2:4 and x:6



11. x:5 and 8:2

12. 4 to 3 and 10 to x



Example 5 B.E.S.T. Test Prep: Writing a Proportion

Black Bean Soup

- 1.5 cups black beans
- 0.5 cup salsa
- 2 cups water
- 1 tomato
- 2 teaspoons seasoning

A chef increases the amounts of ingredients in a recipe to make a proportional recipe. The new recipe has 6 cups of black beans. Which proportion can be used to find the number \boldsymbol{x} of cups of water in the new recipe?

(A)
$$\frac{2}{1.5} = \frac{6}{x}$$
 (C) $\frac{1.5}{2} = \frac{x}{6}$

(B)
$$\frac{1.5}{6} = \frac{x}{2}$$

B
$$\frac{1.5}{6} = \frac{x}{2}$$
 D $\frac{1.5}{2} = \frac{6}{x}$

In the original recipe, the ratio of cups of black beans to cups of water is 1.5:2. In the new

For the new recipe to be proportional to the original recipe, these ratios must be equivalent. So, the values of the ratios must be equal, $\frac{1.5}{2} = \frac{6}{x}$.

