Unit 8 Objective 2 Remediation
Solve Proportions Using Cross Multiplication

Using Cross Products in Proportions

An equation in which two ratios, $\frac{a}{b}$ and $\frac{c}{d}$, are equal is called a proportion.

In the proportion $\frac{a}{b} = \frac{c}{d}$, where b≠0 and d≠ 0, b and c are the means, and a and d are the extremes. The cross products of the proportion $\frac{a}{b} = \frac{c}{d}$ are ad and bc.

In any true proportion, cross products are equal. That is, ad = bc.

Solving Proportions

You can use cross products to write and solve equations.

- **Example 1**

  Solve $\frac{10}{12} = \frac{25}{x}$

  Solution

  The cross products are 10x and 12 · 25, or 300.

  10x = 300 Set the cross products equal to one another.

  $$\frac{10x}{10} = \frac{300}{10}$$

  x = 30

- **Example 2**

  Solve $\frac{x}{1.5} = \frac{-3}{2}$

  Solution

  The cross products are 2x and -3 · 1.5, or -4.5.

  2x = -4.5 Set the cross products equal to one another.

  $$\frac{2x}{2} = \frac{-4.5}{2}$$

  x = -2.25

- **Example 3**

  Solve $\frac{5}{2} = \frac{x+1}{4}$

  Solution

  The cross products are 2(x+1), or 2x + 2 and 5 · 4, or 20.

  2x + 2 = 20 Set the cross products equal to one another.

  2x + 2 – 2 = 20 – 2

  $$\frac{2x}{2} = \frac{18}{2}$$

  x = 9

Try Some! Solve for the variable.

1.) $\frac{6}{7} = \frac{5.4}{b}$

2.) $\frac{a}{5} = \frac{2}{10}$

3.) $\frac{18}{p} = \frac{-9}{25}$

4.) $\frac{5}{6} = \frac{20}{r}$

5.) $\frac{1.5}{8} = \frac{k}{32}$

6.) $\frac{8}{1.6} = \frac{e}{2}$

7.) $\frac{6}{7} = \frac{5.4}{b}$

8.) $\frac{x+2}{7} = \frac{4}{2}$

9.) $\frac{180}{-9} = \frac{60}{n}$

10.) $\frac{4}{7} = \frac{4}{x+2}$