



CHAPTER 11
RATIONAL
EQUATIONS
AND
FUNCTIONS

Section 11.1 Ratio and Proportion

Assignment:

proportion **Two ratios with equivalent quantities**

Properties of Proportions

1. Reciprocal Property

$$\text{if } \frac{a}{b} = \frac{c}{d}; \text{ then } \frac{b}{a} \cdot \frac{a}{b} = 1 \text{ and } \frac{d}{c} \cdot \frac{c}{d} = 1; 1 \cdot 1 = 1$$

2. Cross-Product Property

$$\text{if } \frac{a}{b} = \frac{c}{d}; \text{ then } ad = cb$$

Examples

1. Solve each proportion.

a. $\frac{5}{3c} = \frac{2}{b}$ $\frac{15 = 4c}{5} = c$
 $\frac{15}{5} = \frac{4c}{5}$
 $3 = \frac{4c}{5}$
 $15 = 4c$

c. $\frac{-2}{a-7} = \frac{a}{5}$ $a(a-7) = -10$
 $a^2 - 7a = -10$
 $a^2 - 7a + 10 = 0$
 $(a-2)(a-5) = 0$
 $a = 2$ or $a = 5$
 $\frac{-2}{2-7} = \frac{2}{5}$
 $\frac{-2}{-5} = \frac{2}{5}$
 $\frac{2}{5} = \frac{2}{5}$

b. $\frac{x+6}{3} = \frac{x-5}{2}$ $2(x+6) = 3(x-5)$ $2x+12 = 3x-15$
 $-2x = 3x-15$
 $-12 = 3x-15$
 $3 = 3x$
 $x = 1$

d. $\frac{-2}{w} = \frac{w+1}{w^2}$ $-2w^2 = w(w+1)$
 $-2w^2 = w^2 + w$
 $-3w^2 - w = 0$
 $-w(3w+1) = 0$
 $w = 0$ or $w = -\frac{1}{3}$
 $\frac{-2}{-\frac{1}{3}} = \frac{-\frac{1}{3}+1}{(\frac{-1}{3})^2}$
 $6 = \frac{\frac{2}{3}}{\frac{1}{9}}$
 $6 = 2 \cdot 3$

2. You want to make a scale model of a parade float. The float is 5.5 feet high and 10 feet long. Your model will be 14 inches long. How tall should it be?

$$\frac{h}{14} = \frac{5.5}{10} = \frac{x}{14}$$

$$10x = 77$$

$$x = 7.7 \text{ in}$$

3. A lemonade recipe calls for $\frac{3}{4}$ cup of lemon juice for 2 quarts of lemonade. How much lemon juice should you use for an 8-quart jug of lemonade?

$$\frac{\frac{3}{4} \text{ cup}}{2 \text{ qts}} = \frac{x}{8 \text{ qts}}$$

$$6 = 2x$$

$$3 = x$$