

## Study Guide

**Integration: Algebra  
Using Proportions**

A **ratio** is a comparison of two quantities. The ratio of  $a$  to  $b$  can be expressed as  $\frac{a}{b}$ , where  $b$  is not 0. The ratio can also be written  $a:b$ .

An equation stating that two ratios are equal is a **proportion**. Therefore,  $\frac{a}{b} = \frac{c}{d}$  is a proportion for any numbers  $a$  and  $c$  and any nonzero numbers  $b$  and  $d$ . In any true proportion, the cross products are equal. So,  $\frac{a}{b} = \frac{c}{d}$  if and only if  $ad = bc$ .

**Example:** Solve  $\frac{11}{16} = \frac{44}{x}$  by using cross products.

$$\begin{aligned}\frac{11}{16} &= \frac{44}{x} \\ 11x &= 16 \cdot 44 \\ 11x &= 704 \\ x &= 64\end{aligned}$$

**For Exercises 1–4, use the table to find the ratios. Express each ratio as a decimal rounded to three places.**

Teams	Wins	Losses
Hawks	16	13
Tigers	15	14
Mustangs	12	16

- games won to games lost for Hawks
- games won by the Hawks to games won by Tigers
- games won to games played for Tigers
- games won to games played for Mustangs

**Solve each proportion by using cross products.**

5.  $\frac{9}{28} = \frac{x}{84}$

6.  $\frac{3}{18} = \frac{4x}{7}$

7.  $\frac{x+5}{7} = \frac{x+3}{5}$

**Use a proportion to solve each problem.**

- If two cassettes cost \$14.50, how much will 15 cassettes cost?
- If a 6-foot post casts a shadow that is 8 feet long, how tall is an antenna that casts a 60-foot shadow at the same time?