

## Lesson 5-1

# Ratios

### ISG Interactive Study Guide

See pages 97–98 for:

- Getting Started
- Real-World Link
- Notes

### EQ Essential Question

How can you identify and represent proportional relationships?

### CCSS Common Core State Standards

Content Standards  
7.RP.1

Mathematical Practices  
1, 3, 4, 5



**Vocabulary**  
ratio

### What You'll Learn

- Write ratios as fractions in simplest form.
- Simplify ratios involving measurements.



### Real-World Link

**Surfing** A surfer who rides inside the curl of a wave is said to be *tube riding*. The shape of the tube is described as square, round, or almond, depending on how the length of the wave compares to its width.



## Key Concept Ratios

**Words** A **ratio** is a comparison of two quantities by division.

**Examples**

Numbers	Algebra
3 to 9    3:9 $\frac{3}{9}$	$a$ to $b$ $a:b$ $\frac{a}{b}$

A ratio is a comparison of two quantities by division. If the first number being compared is less than the second, the ratio is usually written as a fraction in simplest form.

Ratios can express part to part, part to whole, or whole to part relationships.

### Example 1



Express the ratio **12 baskets in 18 attempts** as a fraction in simplest form. Explain its meaning.

$$\frac{12}{18} = \frac{2}{3}$$

$\div 6$  (above the fraction bar)  
 $\div 6$  (below the fraction bar)

Divide the numerator and denominator by the GCF, 6.

The ratio of baskets to shots attempted is 2 to 3. This means that for every 3 shots attempted, 2 were made. Also,  $\frac{2}{3}$  of the shots attempted were baskets.

**Got It?** Do this problem to find out.

- Refer to the table. Express the ratio of the life span of a bottlenose dolphin to the life span of a mouse as a ratio in simplest form. Explain its meaning.  
**10** **1** **or 10; This means that for every 10 years a bottlenose dolphin lives, a mouse lives one year.**

Animal	Life Span (years)
bottlenose dolphin	30
mouse	3



## Example 2



Ten out of every 30 Americans own a portable MP3 player. Express this ratio as a fraction in simplest form. Explain its meaning.

$$\frac{10}{30} = \frac{1}{3}$$

$\div 10$   
 $\div 10$

Divide the numerator and denominator by the GCF, 10.

The ratio of Americans who own a portable MP3 player is 1 to 3. This means that for every 3 Americans, 1 owns a portable MP3 player. Also,  $\frac{1}{3}$  of Americans own a portable MP3 player.

**Got It?** Do this problem to find out.

2.  $\frac{3}{20}$ ; **Sample answer:**  
**For every 20 campsites, 3 are reserved for campers with pets.**

2. Fifteen out of 100 campsites at a campground are reserved for campers with pets. Express this ratio as a fraction in simplest form. Explain its meaning.

## Simplify Ratios Involving Measurements

When writing a ratio involving measurements, both quantities should have the same unit of measure.

### Example 3



Express the ratio 8 ounces to 3 pounds as a fraction in simplest form.

$$\frac{8 \text{ ounces}}{3 \text{ pounds}} = \frac{8 \text{ ounces}}{48 \text{ ounces}}$$

$$= \frac{1 \text{ ounce}}{6 \text{ ounces}}$$

Convert 3 pounds to ounces.

Divide the numerator and denominator by the GCF, 8.

Written in simplest form, the ratio is  $\frac{1}{6}$ .



### Watch Out!

Always double check that the units in a ratio match. If the units do not match, you will not get the correct comparison.

**Got It?** Do this problem to find out.

3. Express the ratio 15 inches to 1 foot as a fraction in simplest form.  $\frac{5}{4}$

## Guided Practice



Express each ratio as a fraction in simplest form. (Example 1)

1. 12 boys to 16 girls  $\frac{3}{4}$

2. 24 out of 60 light bulbs  $\frac{2}{5}$

3. 36 DVDs out of 84 DVDs  $\frac{3}{7}$

4. 50 tiles to 25 tiles  $\frac{2}{1}$

5. In Mr. Blackwell's class, 15 out of 24 students play sports. Express this ratio as a fraction in simplest form. Explain its meaning. (Example 2)  $\frac{5}{8}$ ; **For every 8 students, 5 participate in sports.**

Express each ratio as a fraction in simplest form. (Example 3)

6. 3 pints to 4 quarts  $\frac{3}{8}$   $\frac{1}{4}$

7. 2 pounds to 6 ounces  $\frac{8}{3}$

8. 9 inches to 1 yard  $\frac{1}{4}$

9. 6 gallons to 3 quarts  $\frac{1}{1}$