

Lesson 1

Ratios

A **ratio** is a way to compare two quantities using division. Ratios can be written in a number of ways. The ratio representing 7 out of 12 can be written as: 7 to 12, 7:12, and $\frac{7}{12}$. Ratios are usually written as fractions in simplest form when the first number being compared is less than the second number being compared.

Example 1 Express the ratio *16 correct answers out of 20 questions* as a fraction in simplest form. Explain its meaning.

$$\frac{\text{correct answers}}{\text{number of questions}} = \frac{16}{20} = \frac{4}{5} \quad \text{Divide the numerator and denominator by the GCF, 4.}$$

The ratio of correct answers to questions is 4 to 5. This means that for every 5 questions, 4 were answered correctly. Also, $\frac{4}{5}$ of the questions were answered correctly.

When a ratio involves measurements, both quantities should have the same unit of measure. When the quantities have different units of measure, you must convert one unit to the other. It is usually easiest to convert the larger unit to the smaller unit.

Example 2 Express the ratio *6 feet to 15 inches* as a fraction in simplest form.

$$\begin{aligned} \frac{6 \text{ feet}}{15 \text{ inches}} & \quad \text{Write the ratio as a fraction.} \\ = \frac{72 \text{ inches}}{15 \text{ inches}} & \quad \text{Convert 6 feet to 72 inches.} \\ = \frac{24}{5} & \quad \text{Divide the numerator and denominator by the GCF, 3.} \end{aligned}$$

Written in simplest form, the ratio is 24 to 5.

Exercises

Express each ratio as a fraction in simplest form.

- | | |
|-----------------------------|-------------------------------|
| 1. 4 weeks to plan 2 events | 2. 9 children to 24 adults |
| 3. 8 teaspoons to 12 forks | 4. 16 cups to 10 servings |
| 5. 7 shelves to 84 books | 6. 6 teachers to 165 students |
| 7. 14 inches to 3 feet | 8. 20 inches to 2 yards |
| 9. 9 feet to 12 inches | 10. 4 gallons to 2 quarts |
| 11. 3 pints to 2 quarts | 12. 22 ounces to 5 pounds |

Lesson 1 Problem-Solving Practice

Ratios

1. There are 15 girls and 12 boys in Mrs. Johnson's math class. Express the ratio of boys to girls in simplest form.

2. The table lists the medal count for the five countries with the most medals in a recent Summer Olympics. Write a ratio of the number of gold medals won for the USA to the total number of medals won for the USA.

Country	Gold	Silver	Bronze	Total
USA	35	39	29	103
Russia	27	27	38	92
China	32	17	14	63
Australia	17	16	16	49
Germany	14	16	18	48

3. At Windy Pines Summer Camp, there are 255 campers and 30 counselors. Express the ratio of counselors to campers as a fraction in simplest form. Explain its meaning.

4. Students at Parkville Elementary go to school 6 hours a day. The sixth graders have 55 minutes for lunch and recess each day. Express the ratio of the time spent at lunch and recess to the total time spent at school in simplest form.

5. The table below shows the number of each type of animal found at a small zoo.

Animal	Number
Large mammal	75
Small mammal	159
Reptiles	88
Amphibian	92
Birds	107
Fish	73

Express the ratio of large mammals to small mammals as a fraction in simplest form.

6. Refer to the table in Exercise 5. Express the ratio of reptiles and amphibians to the total number of animals as a fraction in simplest form.