

Lesson 3.1 Understanding Ratios

A **ratio** compares 2 numbers. When written out, several phrases can show how the ratio should be written.

4 to 2

4:2

 $\frac{4}{2}$ or $\frac{2}{1}$

6 out of 8

6:8

 $\frac{6}{8}$ or $\frac{3}{4}$

Express each ratio as a fraction in simplest form.

a**b**

- | | |
|--|-------------------------------------|
| 1. 15 feet out of 36 feet _____ | 5 pounds to 35 pounds _____ |
| 2. 48 rainy days out of 60 days _____ | 28 snow days out of 49 days _____ |
| 3. 10 pints to 20 pints _____ | 40 cups to 55 cups _____ |
| 4. 10 miles out of 12 miles _____ | 28 red bikes out of 40 bikes _____ |
| 5. 18 beetles out of 72 insects _____ | 63 gallons to 84 gallons _____ |
| 6. 49 dimes out of 77 coins _____ | 12 cakes out of 36 cakes _____ |
| 7. 15 students out of 30 students _____ | 3 floors out of 18 floors _____ |
| 8. 36 meters out of 100 meters _____ | 14 hats out of 20 accessories _____ |
| 9. 80 scores out of 90 scores _____ | 2 sports out of 19 sports _____ |
| 10. 42 cars out of 124 cars _____ | 7 messages out of 84 messages _____ |

Lesson 3.1 Understanding Ratios

Ratios can be written based on the number of objects in a set.

There are 2 bottles of soda and 5 bottles of water in the refrigerator. $\frac{2}{5}$
Write the ratio of sodas to waters.

Express each ratio as a fraction in simplest form.

a

1. There are 2 cubes and 15 spheres in a geometry box. Write the ratio of spheres to cubes.

2. There are 5 horses and 15 elephants in a circus. Write the ratio of elephants to horses.

3. There are 11 blue marbles and 7 red marbles in a box. Write the ratio of red marbles to blue marbles.

4. There are 5 blue marbles and 16 red marbles in a box. Write the ratio of blue marbles to red marbles.

5. There are 14 cars and 7 vans in a parking lot. Write the ratio of cars to vans.

6. There are 6 pennies and 10 dimes in a jar. Write the ratio of pennies to dimes.

b

There are 5 cars and 4 vans in a parking lot. Write the ratio of vans to cars.

There are 16 horses and 14 elephants in a circus. Write the ratio of horses to elephants.

There are 12 apples and 15 oranges in a fruit basket. Write the ratio of apples to oranges.

There are 12 dogs and 7 cats in a park. Write the ratio of cats to dogs.

There are 7 blue marbles and 8 red marbles in a bag. Write the ratio of red marbles to blue marbles.

There are 24 butterflies and 16 snails on the ground. Write the ratio of butterflies to snails.

Lesson 3.4 Understanding Unit Rates

A **rate** is a special ratio that compares quantities of two different types of items—for example, *340 miles per 10 gallons* ($340 \text{ mi.}/10 \text{ gal.}$). In a **unit rate**, the second quantity is always 1, such as in *34 miles per gallon* ($34 \text{ mi.}/1 \text{ gal.}$). This allows you to see how many of the first item corresponds to just one of the second item.

Suppose you want to divide students equally between buses for a field trip. To see how many students should go on each bus, find the unit rate.

If there are 160 students and 4 buses, how many students should go on each bus?

$\frac{160}{4} = \frac{s}{1}$ To find the number of students for one bus, divide by the number of buses total.

$\frac{160}{4} = \frac{40}{1}$ The unit rate is $\frac{40}{1}$, or 40 students per bus.

SHOW YOUR WORK

Solve each problem by finding the unit rate.

1. John can create 20 paintings in 4 weeks. How many paintings can he create each week?
2. Sasha can walk 6 miles in 3 hours. If she has to walk 1 mile, how long will it take her?
3. Todd keeps his 4-room house very clean. It takes him 1 hour and 36 minutes to clean his whole house. How long does it take him to clean one room?
4. Victoria can make 8 necklaces in 4 days. How long does it take her to make one necklace?
5. Byron has his own bakery. He bakes 84 cakes each week. How many cakes can he make in one day?
6. Charlie buys 3 computer tables for \$390. How much did he pay for each table?

1.

2.

3.

4.

5.

6.

Lesson 3.5 Problem Solving**SHOW YOUR WORK**

Solve the problems below using ratios and unit rates.

- 1.** Gas mileage is the number of miles you can drive on a gallon of gasoline. A test of a new car results in 440 miles driven on 20 gallons of gas. How far could you drive on 60 gallons of gas? _____

What is the car's gas mileage? _____

- 2.** An ice-cream factory makes 100 quarts of ice cream in 5 hours. How many quarts could be made in 36 hours? _____

What was that rate per day? _____

- 3.** A jet travels 590 miles in 5 hours. At this rate, how far could the jet fly in 10 hours? _____

What is the rate of speed of the jet? _____

- 4.** You can buy 5 cans of green beans at the Village Market for \$2.30, or you can buy 10 of them at Best Food for \$5.10.

Which place is the better buy? _____

- 5.** You can buy 3 apples at the Quick Stop for \$1.29. You can buy 5 apples at Shop and Save for \$2.45.

Which place is the better buy? _____

- 6.** A ferris wheel can accommodate 55 people in 15 minutes.

How many people could ride the ferris wheel in 2 hours? _____

What is the rate per hour? _____

1.

2.

3.

4.

5.

6.