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LESSON 17 Ratios and Rates

A **ratio** is a comparison of two quantities.

There are 9 CDs and 15 DVDs on a desk. The ratio of CDs to DVDs is 9 to 15, or 9:15, or $\frac{9}{15}$.

A **rate** is a ratio that compares quantities of **different** units of measure. If the comparison is to 1 unit, it is called a **unit rate**.

Kenneth ran 80 meters in 10 seconds. His rate was $\frac{80 \text{ meters}}{10 \text{ seconds}}$. The unit rate was 8 meters per second.

A ratio can compare:

- part to part
apples to oranges
- part to whole
apples to pieces of fruit
- whole to part
pieces of fruit to apples

Ratios can be simplified to lowest terms. For example, 9:15 simplifies to 3:5.

Read each problem. Circle the letter of the best answer.

1 Lara bought 4 pounds of grapes for a total of \$8.60. What was the cost per pound of the grapes?

- A** \$2.15 per pound
- B** \$2.60 per pound
- C** \$4.15 per pound
- D** \$4.60 per pound

The cost per pound is a unit rate. Write the rate as a fraction: $\frac{\$8.60}{4}$. Divide the numerator and denominator by 4: $\frac{\$8.60}{4} = \frac{\$8.60 \div 4}{4 \div 4} = \frac{\$2.15}{1}$, or \$2.15 per pound. The correct answer is A.

2 Which of these ratios is a rate?

- A** 6 hours:3 hours
- B** 8 books:5 days
- C** 12 dozen:15 dozen
- D** 14 pounds:16 pounds

3 Charley filled a 5-gallon water jug in 100 seconds. At what rate did he fill the jug?

- A** 0.05 gallon per second
- B** 0.2 gallon per second
- C** 5 gallons per second
- D** 20 gallons per second

4 Mariko is riding her skateboard at an average rate of 12 miles per hour. At this rate, how far will she go in $\frac{1}{4}$ hour?

- A** 9 miles
- B** 6 miles
- C** 4 miles
- D** 3 miles

Read each problem. Write your answers.

5 A glacier moved 3 meters in 10 days.

A What was the glacier's average rate of speed in meters per day?

Answer: _____

B Explain how you found your answer.

6 A scientist measured the mass and volume of a piece of aluminum. The mass was 54 grams, and the volume was 20 cubic centimeters.

A What was the density (in grams per cubic centimeter) of the aluminum?

Answer: _____

B An aluminum airplane part has a volume of 410 cubic centimeters. If its density is the same as your answer to part A, what is the mass in grams of the airplane part?

Answer: _____

C Explain how you found your answer to part B.
