2-6 Ratios, Rates, and Conversions

Vocabulary

Review

1. Write a fraction with a *numerator* of 12 and a *denominator* of 13.

2. Circle the fractions that are in simplest form.

$\frac{15}{30}$ $\frac{5}{18}$ $\frac{17}{42}$ $\frac{22}{33}$

3. Circle the *greatest common divisor* of the *numerator* and the *denominator* of a fraction that is in simplest form.

0 1 2 3

Vocabulary Builder

rate (noun) **rayt**

Definition: A **rate** is a ratio that compares quantities measured in *different* units.

Examples: miles per gallon, cost per ounce, words per minute

Using Symbols: $\frac{23 \text{ mi}}{1 \text{ gal}}$, $\frac{\$1.32}{8 \text{ oz}}$, $\frac{302 \text{ words}}{5 \text{ minutes}}$

You read the **rate**
45 mi/h
as
"45 miles per hour."

Use Your Vocabulary

Write a *rate* for each situation.

4. Chandler bicycles 20 miles per hour.

5. Ann makes 80 bagels every 3 days.

6. So far, you have read 35 pages out of a 50-page assignment. Explain why the ratio 35 pages out of 50 pages is NOT a *rate*.

Problem 1 Comparing Unit Rates

Got It? **The prices for one shirt at three different stores are shown in the box at the right. If Store B lowers its price to $42 for four shirts, which store offers the best deal for one shirt? Explain.**

Price for 1 Shirt
Store A: $12.50
Store B: $11.25
Store C: $10

7. Circle the store that offered the best deal before Store B lowered its price.

Store A Store B Store C

8. Find Store B's new unit rate based on $42 for 4 shirts.

$$\frac{\text{cost of shirts}}{\text{number of shirts}} = \frac{\quad}{\quad} = \frac{\quad}{1 \text{ shirt}}$$

9. Circle the store that offers the best deal now.

Store A Store B Store C

10. Why does this store have the best deal?

_____

_____

A *conversion factor* is a ratio of two equivalent measures in different units. A conversion factor is always equal to 1.

11. Complete each conversion factor.

$\frac{1 \text{ ft}}{\quad \text{in.}}$ $\frac{\quad \text{mi}}{5280 \text{ ft}}$ $\frac{1 \text{ m}}{\quad \text{cm}}$ $\frac{\quad \text{h}}{60 \text{ min}}$

Problem 2 Converting Units

Got It? **What is 1250 cm converted to meters?**

12. There are ____ centimeters in one meter.

Underline the correct word to complete each sentence.

13. When you convert from centimeters to meters, the number of meters will be greater than / less than the number of centimeters.

14. When you convert from centimeters to meters, the appropriate conversion factor will allow you to multiply / divide out the common units.

15. **Multiple Choice** Choose the conversion factor for converting centimeters to meters.

(A) $\frac{1 \text{ m}}{100 \text{ cm}}$ (B) $\frac{1 \text{ m}}{1000 \text{ cm}}$ (C) $\frac{100 \text{ cm}}{1 \text{ m}}$ (D) $\frac{1000 \text{ cm}}{1 \text{ m}}$

16. Complete the conversion.

$1250 \text{ cm} \cdot \frac{\quad}{\quad} = \quad \text{m}$

Problem 3 Converting Units Between Systems

Got It? **The Sears Tower in Chicago, Illinois, is 1450 ft tall. How many meters tall is the tower? Use the fact that 1 m ≈ 3.28 ft.**

17. Follow the steps to find how many meters tall the Sears Tower is.

1 Write the conversion factor as a ratio. Remember, the units to be divided out should be in the denominator.

$\frac{\square\ \text{m}}{\square\ \text{ft}}$

2 Find the height of the tower.

$1450\ \text{ft} \cdot \frac{\square\ \text{m}}{\square\ \text{ft}} \approx \square\ \text{m}$

3 The height of the Sears Tower is about ____ meters.

You can also convert rates. Because rates compare measures in two different units, you must multiply by two conversion factors to change both of the units.

Problem 4 Converting Rates

Got It? **An athlete ran a sprint of 100 ft in 3.1 s. At what speed was the athlete running in miles per hour? Round to the nearest mile per hour.**

18. Circle what you know. Underline what you want to find out.

speed of the athlete in feet per second speed of the athlete in miles per hour

19. Underline the correct word to complete the sentence.

When writing a conversion factor, if the unit to be converted is in the numerator, then that unit should be in the numerator / denominator of the conversion factor.

20. You will need to perform two conversions to solve the problem. Circle the conversion factor you will use to convert to miles per second. Underline the conversion factor you will use to convert to miles per hour.

$\frac{1\ \text{mi}}{5280\ \text{ft}}$ $\frac{5280\ \text{ft}}{1\ \text{mi}}$ $\frac{3600\ \text{s}}{1\ \text{h}}$ $\frac{1\ \text{h}}{3600\ \text{s}}$

21. Use the conversion factors to solve the problem.

Lesson Check • Do you UNDERSTAND?

Reasoning **Does multiplying by a conversion factor change the amount of what is being measured? How do you know?**

22. Circle the equations that are true.

$39 \cdot 1 = 39$ $\quad 1 \cdot x = x$ $\quad x \cdot 1 = x + 1$ $\quad \frac{5}{5} \cdot x = x$

23. A conversion factor is always equal to _____.

24. Underline the correct word, words, or number to complete the sentence.

Multiplying by a conversion factor changes / does not change what is being measured because you are multiplying by 0 / 1.

Lesson Check • Do you UNDERSTAND?

Reasoning **If you convert pounds to ounces, will the number of ounces be *greater* or *less* than the number of pounds? Explain.**

25. There are _____ ounces in 1 pound.

26. Convert 2 pounds to ounces.

$2 \text{ lb} \cdot \frac{\quad}{\quad} = \quad \text{oz}$

27. Convert 48 ounces to pounds.

$48 \text{ oz} \cdot \frac{\quad}{\quad} = \quad \text{lb}$

28. Underline the correct word to complete the sentence.
If you convert pounds to ounces, the number of ounces will be greater / less than the number of pounds.

29. Explain your answer to Exercise 28.

_____

_____

Math Success

Check off the vocabulary words that you understand.

☐ ratio ☐ rate ☐ unit rate ☐ conversion factor ☐ unit analysis

Rate how well you can *compare and convert ratios and rates.*

Need to review 0 2 4 6 8 10 Now I get it!