

Objective Introduction to Unit Rates

Warm-Up



Determine each unknown quantity.

$$1. \frac{18 \text{ arrows}}{3 \text{ bows}} = \frac{162 \text{ arrows}}{? \text{ bows}}$$

$$2. \frac{8 \text{ shoes}}{80 \text{ socks}} = \frac{? \text{ shoes}}{1600 \text{ socks}}$$

$$3. \frac{18 \text{ arrows}}{3 \text{ bows}} = \frac{? \text{ arrows}}{1 \text{ bows}}$$

$$4. \frac{8 \text{ shoes}}{80 \text{ socks}} = \frac{1 \text{ shoes}}{? \text{ socks}}$$

GETTING STARTED

Which One Would You Buy?

Marta and Brad go to the store to buy some laundry detergent for a neighbor. They see that the brand she wants comes in two different sizes:

26 fluid ounces for \$9.75

20.5 fluid ounces for \$7.25

1. Which size should Marta and Brad buy? Explain the reason for your decision.



As you learned previously, a rate is a ratio in which the two quantities being compared are measured in different units. A unit rate is a comparison of two measurements in which the numerator or denominator has a value of one unit.

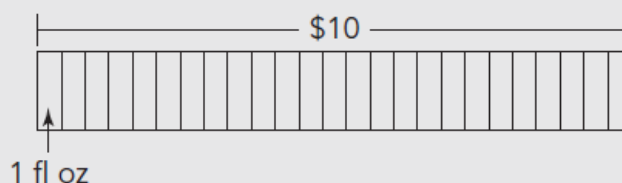
One way to compare the values of items is to calculate the unit rate for each item.

Marta estimated unit rates for two detergents this way:

Marta

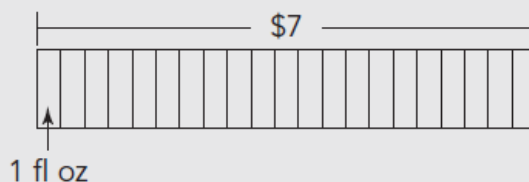


The larger bottle of detergent is about 25 fluid ounces for about \$10.



So, each fluid ounce costs about $\frac{\$10}{25 \text{ fl oz}}$, which is $\frac{\$2}{5 \text{ fl oz}}$,
or $\frac{\$0.40}{1 \text{ fl oz}}$.

The smaller bottle of detergent is about 21 fluid ounces for about \$7.



So, each fluid ounce costs about $\frac{\$7}{21 \text{ fl oz}}$, which is $\frac{\$1}{3 \text{ fl oz}}$,
or about $\frac{\$0.33}{1 \text{ fl oz}}$.

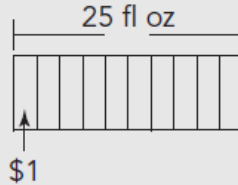
That means that you pay less for each fluid ounce of the smaller bottle of detergent, so it is the better buy.

Brad estimated the unit rates this way:

Brad

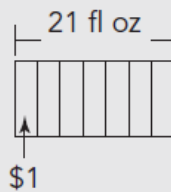


For the larger bottle of detergent, you spend about \$10 for about 25 fluid ounces.



So, for each dollar you spend on the larger bottle of detergent, you get about $\frac{25 \text{ fl oz}}{\$10}$, or $\frac{2.5 \text{ fl oz}}{\$1}$.

For the smaller bottle of detergent, you spend about \$7 for about 21 fluid ounces.



So, for each dollar you spend on the smaller one, you get about $\frac{21 \text{ fl oz}}{\$7}$, or $\frac{3 \text{ fl oz}}{\$1}$.

Because you get more detergent in the smaller bottle for each dollar you spend, the smaller bottle is the better buy.

1. Marta and Brad both chose the smaller bottle of detergent as the better buy, but for different reasons. Explain the differences in their reasoning.

2. Calculate the actual unit rate for each of the two sizes of detergent in two different ways.



Unit rates can be written with either quantity as the unit.

1. Each situation relates a quantity and a price. Calculate the two different unit rates associated with each situation: price per item and number of items per dollar.

a. A bottle of 250 vitamins costs \$12.50.

b. A pack of 40 AAA batteries costs \$25.95.

c. A package of 24 rolls of toilet paper costs \$16.25.

d. A box of 500 business cards costs \$19.95.

2. Not all unit rates involve money. Write two different unit rates associated with each situation.

a. The 5 goats eat 12 tomatillos.

b. The exchange rate is 10 U.S. dollars for every 9 euros.

c. The average stalactite grows 30 mm every 10 years.

d. Sandy buys 500 coffee pods every year.

3. For each part of Question 2, identify which unit rates are useful in discussing the situation

The unit rate needed to solve a problem is often asked for in the question.

4. For each situation, identify the unit rate that would answer the question. Explain how you decided which unit rate to write.

a. How many tomatillos did each goat eat?

b. About how many euros is each U.S. dollar worth?

c. How much does each stalactite grow in a month?

d. How many coffee pods can Sandy use each week?



LESSON 6.2a What is the Best Buy?



Objective

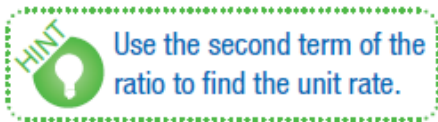
Introduction to Unit Rates

Practice

Write a ratio for each rate. Then find the unit rate.

1. 120 miles in 5 hours

2. 96 words in 3 minutes



3. 208 people in 4 buses

4. 136 points in 8 games

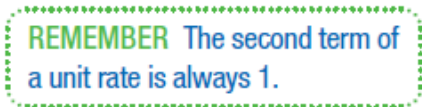
5. \$2.70 for 3 goldfish

6. \$14 for 7 comic books

Find each unit rate.

7. 48 grams of protein in 4 servings

8. 1,068 miles in 3 hours



9. 140 students to 5 teachers

10. \$3.60 for 12 eggs

11. 72 strikeouts in 12 games

12. 190 feet in 5 seconds

13. 32 students to 4 parents

14. 640 miles per 20 gallons
