Lesson 2

Understand Unit Rate

Name:

Prerequisite: How do you show division using fractions?



Study the example problem showing how to write a division problem as a fraction. Then solve problems 1–7.

Example

There are 3 bags of popcorn to divide equally among 2 students. How much popcorn will each student get?

There are 3 bags of popcorn for 2 students to share, which is $3 \div 2$.

Divide each of the 3 bags into 2 equal parts. Each student will get $\frac{1}{2}$ of each bag.

$$\frac{1}{2} \times 3 = \frac{3}{2}$$

$$3 \div 2 = \frac{3}{2}$$

Each student will get $\frac{3}{2}$ bags of popcorn.

- 1 How many whole bags plus how many one-half bags of popcorn would each student get?
 - _____ whole bag(s) ______ one-half bag(s)
- 2 How can you combine your answers in problem 1 to write how many bags of popcorn each student will get as a mixed number?
- 3 Nine yards of ribbon are cut into 8 equal pieces. What is the length of each piece of ribbon? Write a division expression to represent the problem and solve.

Solve.

4	How could you model 5 students sharing 4 bags of
	popcorn equally? How much will each student get?

In a store, 60 cans of soup are arranged to be displayed in 10 equal rows. Why does the fraction $\frac{10}{60}$ not represent this situation? Explain.

6 Emilio bakes 2 pies. He shares them equally among 3 friends. How much pie does each person get? Express your answer as a fraction.

Show your work.

Solution:

Isabel is making lemonade for a party with 12 guests. She wants to make equal servings that are least 2 cups each. She makes 7 quarts of lemonade. Does she have enough lemonade for each guest? (1 quart = 4 cups)

Show your work.

Solution: _____

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Find Unit Rates

Study the example showing how a double number line is used to find rate and unit rates. Then solve problems 1–6.

Example

The double number line below shows the relationship between the numbers of hours and weeks Linda works. Linda worked 320 hours in 8 weeks.

Hours 0 40 80 120 160 200 240 280 320

The ratio of hours to weeks is 320 to 8.

The rate is 40 hours to 1 week. The unit rate is 40.

1 Choose a corresponding pair of numbers from the top and bottom number lines. Write a multiplication equation to show how the number of weeks and hours are related.

2 Use words to describe the relationship between corresponding numbers of hours and weeks.

3 Explain how you can use the answer to problem 2 to verify the unit rate is 40.



rate compares the first quantity in a ratio to only one of the second quantity.

unit rate the number in a rate that is being compared to 1.

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Solve.

Use the following situation to solve problems 4–5.

The double number line shows the relationship between dollars earned and cars washed at a school fundraiser. Students earned 48 dollars washing 8 cars. The ratio of dollars earned to cars washed is 48 : 8.



What pattern do you see in the dollars earned?Use the pattern to complete the top number line.

What pattern do you see in the number of cars washed? Use the pattern to complete the bottom number line.

Explain how the patterns show the rate of dollars earned to cars washed.

5 The unit rate comparing dollars earned to cars washed is 6. If the fundraiser earned \$318, how many cars were washed? Explain.

⁶ There are 50 campers at day camp and 10 counselors. Write the ratio of campers to counselors as a fraction. Explain how to use equivalent fractions to write a related rate and unit rate. What does the unit rate tell you?

Reason and Write

Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

Example

Mom's muffin recipe uses 10 ounces of berries for 2 dozen muffins. Grandma's muffin recipe uses 12 ounces of berries for 3 dozen muffins. Which recipe has more berries per dozen muffins? How many ounces of berries would you need to make 60 muffins of this recipe? (1 dozen = 12 muffins)

Show your work. Use ratios, unit rates, models, and words to explain your thinking.

In Mom's recipe, the ratio of berries (ounces) to muffins (dozens) is 10 : 2. There are 5 ounces of berries per 1 dozen muffins. So the unit rate is 5.



In Grandma's recipe, the ratio of berries (ounces) to muffins (dozens) is 12 : 3. There are 4 ounces of berries per 1 dozen muffins. So the unit rate is 4.



The unit rate of 5 is greater than the unit rate of 4, so Mom's recipe has more berries per dozen.

60 muffins = 5 dozen muffins, so I would need 5 \times 5 or 25 ounces of berries for 5 dozen muffins of Mom's recipe.

Where does the example . . .

- answer both parts of the problem?
- use words to explain?
- use numbers to explain?
- use models to explain?
- give details?



Solve the problem. Use what you learned from the model.

You buy 3 tickets for \$48 total for the jazz concert on Friday night. Your friend buys 2 tickets for \$36 total for the jazz concert on Saturday night. Your brother collected \$96 from his friends to buy 6 tickets. Which night can they go to the concert? Did they buy the less expensive tickets? Explain.

Show your work. Use ratios, unit rates, models, and words to explain your thinking.

Where does the example . . .

- answer both parts of the problem?
- use words to explain?
- use numbers to explain?
- use models to explain?
- give details?



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