

Understand Division with Fractions

Name: _____

Prerequisite: How do you divide with unit fractions?



Study the example problem showing division of a whole number by a unit fraction. Then solve problems 1–7.

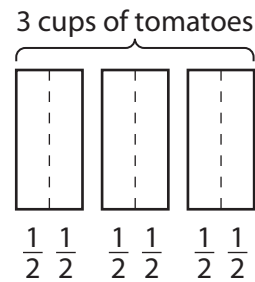
Example Problem

Karl puts $\frac{1}{2}$ cup of chopped tomatoes into each salad he makes. How many salads can he make with 3 cups of tomatoes?

The model represents the problem. You can use the model to write a division equation and a multiplication equation.

$$3 \div \frac{1}{2} = 6$$

$$3 \times 2 = 6$$



Both equations show that Karl can make 6 salads with 3 cups of tomatoes.

- 1** Explain how the model represents $3 \div \frac{1}{2} = 6$.

- 2** Explain how the model represents $3 \times 2 = 6$.

- 3** Suppose Karl uses 5 cups of tomatoes. How many salads can he make? Write both a division equation and a multiplication equation to show your solution.

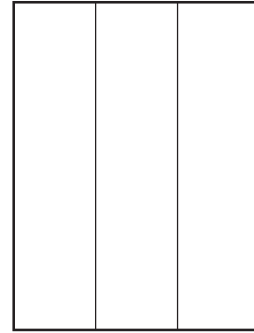
Vocabulary

unit fraction a fraction with a numerator of 1.

$\frac{1}{3}$, $\frac{1}{8}$, and $\frac{1}{12}$ are unit fractions.

Solve.

- 4 Four students are sharing $\frac{1}{3}$ carton of yogurt equally. Complete the steps to find what fraction of the carton each student gets.

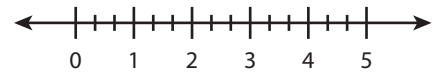


- The model at the right represents 1 carton. Shade the model to show $\frac{1}{3}$ carton.
- Divide the model into 4 equal parts by drawing horizontal lines to represent sharing among 4 students. Shade one row to show $\frac{1}{4}$.
- Complete the equation to show what fraction of the carton of yogurt each student gets.

$$\frac{1}{3} \div 4 = \underline{\hspace{2cm}} \text{ carton of yogurt}$$

- 5 Use the model in problem 4 to write a multiplication equation that can be used to solve the problem.

- 6 Find $2 \div \frac{1}{3}$. Explain how to use the number line to find the answer.



- 7 Ana has $\frac{1}{2}$ hour of free time. She divides the time equally between walking her dog and playing her favorite song on the piano. If she plays the song 3 times, how long is the song? Give your answer as a fraction of an hour. Write division equations to represent the problem.

Show your work.

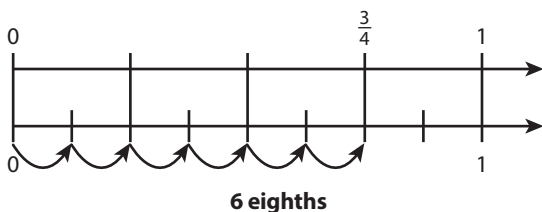
Solution: _____

Divide by a Fraction

Study the example problem showing division of a fraction by a fraction. Then solve problems 1–10.

Example

Mr. Garcia has $\frac{3}{4}$ yard of ribbon to make badges for winners of the science fair. He uses $\frac{1}{8}$ yard of ribbon for each badge. How many badges can Mr. Garcia make?



Find the number of eighths in $\frac{3}{4}$. Use the number lines.

$$\frac{3}{4} \div \frac{1}{8} = 6$$

Mr. Garcia can make 6 badges.

- 1 What does $\frac{3}{4}$ on the top number line represent?

- 2 What does each equal part on the bottom number line represent?

- 3 How many eighths are in $\frac{3}{4}$? _____
- 4 Suppose Mr. Garcia is making badges using $\frac{3}{8}$ yard of ribbon for each badge. He starts with the same amount of ribbon, $\frac{3}{4}$ yard. How many badges can he make? Write a division equation that supports your answer.

Solve.

Use the following situation to solve problems 5–9.

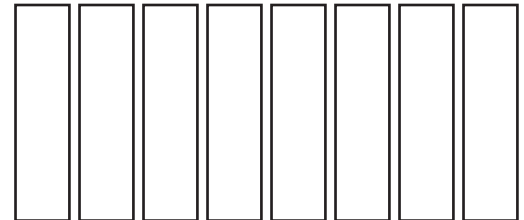
Rosa puts $\frac{2}{3}$ cup of vegetable mixture in 1 tortilla. She has 8 cups of vegetable mixture.

- 5** Rosa says that to find how many tortillas she can fill, she first finds how many $\frac{1}{3}$ cups are in 8 cups. What else must Rosa do to find how many tortillas she can fill?

- 6** Do you expect the number of tortillas Rosa can fill to be less than or greater than 8? Explain.

- 7** The rectangles represent 8 cups of vegetable mixture. Draw lines to divide each rectangle into thirds.

- 8** Circle groups of $\frac{2}{3}$ rectangle. How many groups are there? _____



- 9** Complete the division equation to show how many tortillas Rosa can fill.

$$8 \div \frac{2}{3} = \text{_____ tortillas}$$

- 10** Mike pours $\frac{12}{8}$ cups of orange juice into serving glasses. Each glass holds $\frac{3}{4}$ cup. How many glasses can he fill? Use a common denominator to divide.

Show your work.

Solution: _____

Reason and Write

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

Example

Steve said that $\frac{4}{3} \div \frac{1}{6}$ equals $\frac{4}{6}$. How do you know without dividing whether Steve's statement is reasonable? Justify your answer by showing how to find the quotient.

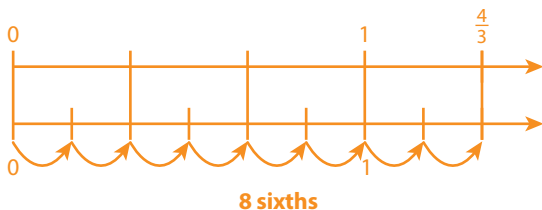
Show your work. Use numbers, words, and models to explain your answer.

Steve's statement is not reasonable. The division

$\frac{4}{3} \div \frac{1}{6}$ asks how many sixths are in $\frac{4}{3}$. $\frac{4}{3}$ is greater than 1, and there are 6 sixths in 1. So I know there are more than 6 sixths in $\frac{4}{3}$. That means the quotient must be greater than 1. It could not be a fraction less than 1, such as $\frac{4}{6}$.

I drew a number line model to find the quotient. The top number line is divided into thirds and shows $\frac{4}{3}$.

The bottom number line is divided into sixths and shows that there are 8 sixths in $\frac{4}{3}$. So $\frac{4}{3} \div \frac{1}{6} = 8$.



Where does the example ...

- use numbers to explain?
- use words to explain?
- use models to explain?
- give details?



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

Brenda said that $\frac{5}{2} \div \frac{1}{4}$ equals 10. How do you know without dividing whether Brenda's statement is reasonable? Justify your answer by showing how to find the quotient.

Show your work. Use numbers, words, and models to explain your answer.

Did you ...

- use numbers to explain?
- use words to explain?
- use models to explain?
- give details?

