

Day 3 Answer Keys

Wednesday, March 18, 2020 10:56 AM

FCS Day 3
Math

Lesson 17 Introduction

MGSE5.NF.7a
MGSE5.NF.7b

Understand Division with Unit Fractions



Think It Through

How is dividing with fractions related to multiplying with fractions?



You know that multiplication and division are related. Dividing 8 by 4, for example, gives the same result as multiplying 8 by $\frac{1}{4}$.

$$8 \div 4 = 2$$

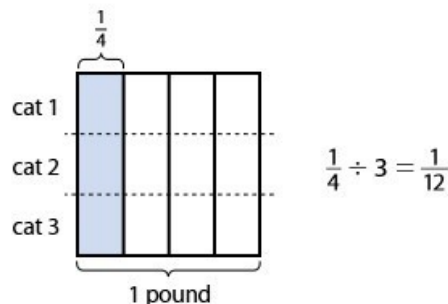
$$8 \times \frac{1}{4} = 2$$

Dividing with unit fractions works the same way. You can solve a division problem involving fractions by multiplication.

Think What does dividing a unit fraction by a whole number mean?

Mrs. Cook wants to share $\frac{1}{4}$ pound of fish equally among 3 cats.

That means she needs to divide $\frac{1}{4}$ into 3 equal parts. You can draw an area model to represent the problem.



If $\frac{1}{4}$ pound of fish is divided into 3 equal parts, each cat will receive $\frac{1}{3}$ of the $\frac{1}{4}$ pound of fish.

$$\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$$



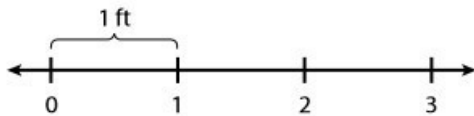
Circle the multiplication equation that solves the division situation.

Think What does dividing a whole number by a unit fraction mean?

Mr. Putnam wants to cut a 3-foot rope into $\frac{1}{4}$ -foot sections.

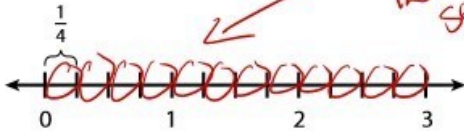
To figure out how many sections he will get, Mr. Putnam thinks, "How many fourths are in 3?"

You can draw a number line to represent the 3 feet of rope. There are three 1-foot sections.



You can mark fourths on the number line to represent $\frac{1}{4}$ foot. You can see there are twelve $\frac{1}{4}$ -foot sections in 3 feet.

$$3 \div \frac{1}{4} = 12$$



You can also write a multiplication equation to show how many fourths are in 3. There are 4 fourths in each whole foot. To find the number of fourths in 3 feet, you can multiply.

$$3 \times 4 = 12$$

When you divide 3 by $\frac{1}{4}$, you are dividing 3 into parts smaller than 1. So there will be more than 3 of those parts.

Reflect

- 1 Explain what it means to divide 5 by $\frac{1}{4}$.

Dividing 5 by $\frac{1}{4}$ means, I have 5 wholes and each whole is divided into fourths ($\frac{1}{4}$). I will have a total of 20 fourths.



Look at the answer to this division problem. It is greater than 3, the number I started with!

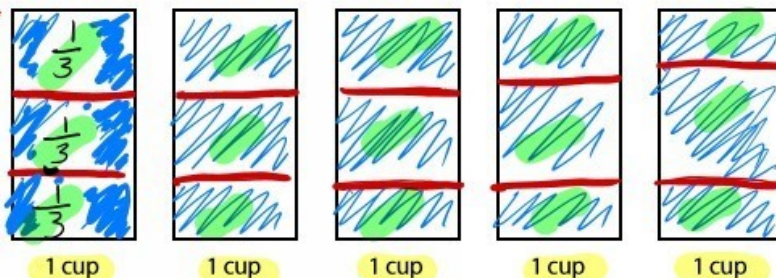
Let's Explore the Idea Explore dividing a whole number by a unit fraction with the problem below.



Jemma made 5 cups of pancake batter. She uses a scoop measuring $\frac{1}{3}$ cup to pour batter onto the skillet to make large pancakes. How many pancakes can Jemma make?

The 5 rectangles below represent the 5 cups of pancake batter.

3 one-third cups = 1 cup



15 scoops total are in 5 cups

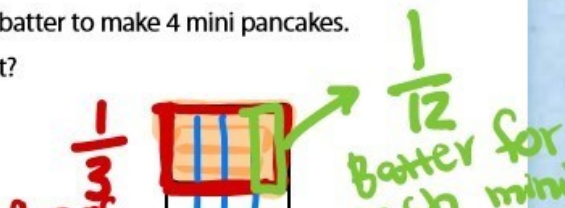
- 2 You need to find out how many $\frac{1}{3}$ scoops there are in 5 cups.
- * 3 The scoop holds $\frac{1}{3}$ cup of batter. How many scoops are in 1 cup? 3
- 4 Divide each of the 5 rectangles into sections to show your answer to problem 3.
- 5 How many scoops are in 5 cups? 15
- 6 $5 \div \frac{1}{3} =$ 15 scoops
- 7 What multiplication equation will also solve this problem? $5 \times 3 = 15$
- 8 How is 5×3 related to $5 \div \frac{1}{3}$? There are 3 one-third scoops per 1 cup of batter. There are a total of 5 cups of batter. Therefore, it is a total of 15 one-third scoops in 5 cups of batter.

Let's Talk About It
Solve the problems below as a group.



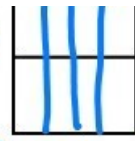
Suppose Jemma wanted to divide $\frac{1}{3}$ cup of pancake batter to make 4 mini pancakes. What fraction of a cup of batter will each pancake get?

- 9 The rectangle to the right shows 1 cup divided into 3 equal sections. How much does each section represent?



$\frac{1}{3}$ cup of batter

Cup of batter



each pancake

10 Shade $\frac{1}{3}$ of the rectangle to show $\frac{1}{3}$ cup.

11 You need to divide $\frac{1}{3}$ cup equally to make 4 pancakes.

Divide each third of the rectangle vertically into 4 equal parts.

Then shade $\frac{1}{4}$ of the rectangle to show 1 of the 4 pancakes.

4 equal amounts

12 The overlapping section shows the fraction of a cup of batter that each pancake will get. What is this fraction? $\frac{1}{12}$

13 $\frac{1}{3} \div 4 = \frac{1}{12}$

$\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$

14 What multiplication equation also solves $\frac{1}{4}$ of $\frac{1}{3}$?

15 How is $\frac{1}{3} \div 4$ related to $\frac{1}{3} \times \frac{1}{4}$? If $\frac{1}{3}$ cup of batter is divided into 4 equal amounts, each mini pancake will have $\frac{1}{12}$ of a cup of batter.

Try It Another Way Explore dividing by a unit fraction using a common denominator.

Another way to think about dividing unit fractions is to write equivalent fractions with a common denominator. What is $5 \div \frac{1}{2}$?

$\frac{10}{2} =$

16 Write 5 as a fraction with a denominator of 2.

17 Divide $\frac{10}{2}$ into equal groups of $\frac{1}{2}$. How many groups can you make? 10 groups

18 $5 \div \frac{1}{2} = 10$

Lesson 17 Guided Practice

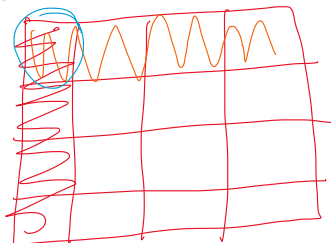
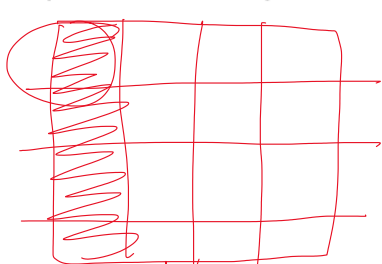
Connect Ideas About Dividing with Unit Fractions

Talk through these problems as a class. Then write your answers below.

19 Compare Draw a model to represent $\frac{1}{4} \div 4$ and a model to represent $\frac{1}{4} \times \frac{1}{4}$.

Explain the relationship between the two expressions.

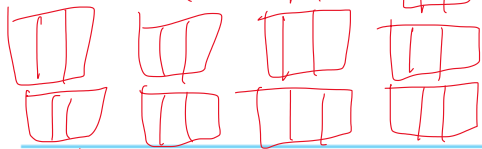
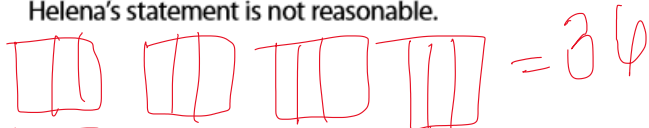
$\frac{1}{4} \div 4$



Dividing and multiplying by a reciprocal is the same thing.

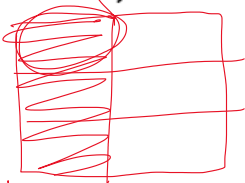
20 Analyze Helena said that $12 \div \frac{1}{3}$ is 4. Draw a model and use words to explain why

Helena's statement is not reasonable.



I split each whole into thirds. The answer should be 36.

21 Justify Show that $\frac{1}{2} \div 3 = \frac{1}{6}$ by using a model. Explain why the result is less than the number you started with, $\frac{1}{2}$.



I split $\frac{1}{2}$ into 3 parts. Each part is $\frac{1}{6}$.

Lesson 17 Independent Practice

Apply Ideas About Dividing with Unit Fractions

22 Put It Together Use what you have learned to complete this task.

Choose one of the following problems to solve. Circle the problem you choose.

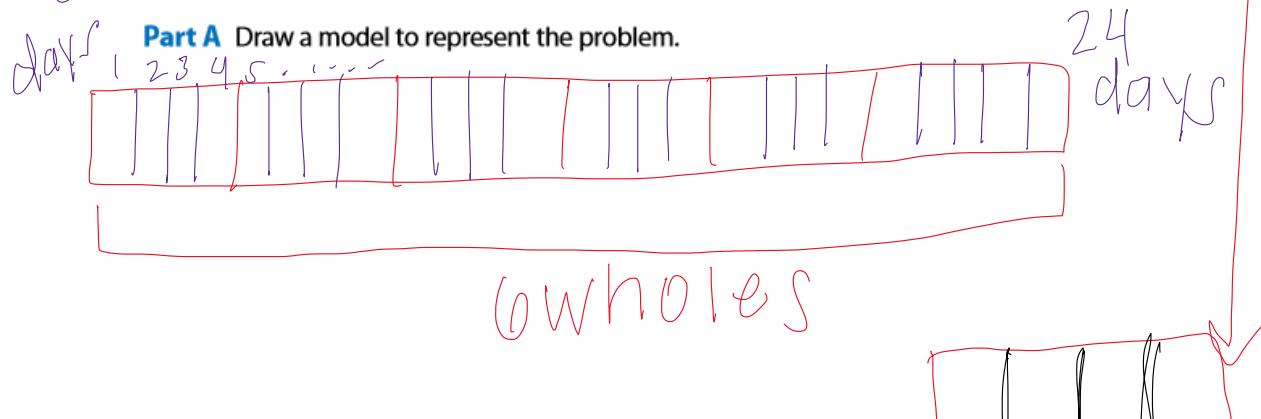
①

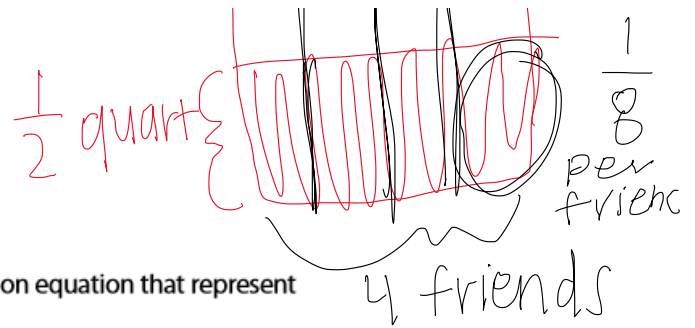
Drew wants to run at least 6 miles this month. He plans to run $\frac{1}{4}$ mile each day. How many days will it take Drew to run 6 miles?

②

Maya made $\frac{1}{2}$ quart of strawberry jam. She plans to share it equally among 4 friends. How much jam will each friend get?

Part A Draw a model to represent the problem.





Part B Write a division equation and a multiplication equation that represent the problem.

① $6 \div \frac{1}{4}$ or 6×4

② $\frac{1}{4} \times \frac{1}{2}$ or $\frac{1}{2} \div 4$



FCS Day 3
Math

Lesson 17
Understand
Division with Unit Fractions

Name: _____

Prerequisite: How do you find a fraction of a fraction?



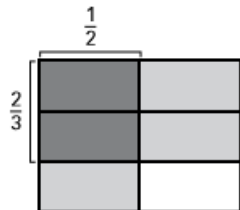
Study the example problem showing two ways to find a fraction of a fraction. Then solve problems 1–5.

Example

The Padis family had $\frac{1}{2}$ pan of lasagna left from dinner. They ate $\frac{2}{3}$ of the leftovers the next day for lunch. What fraction of the whole pan of lasagna did they eat for lunch?

You need to find $\frac{2}{3}$ of $\frac{1}{2}$. $\frac{2}{3}$ of $\frac{1}{2}$ means $\frac{2}{3} \times \frac{1}{2}$.

You can draw a picture.



You can write an equation.

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

Both the picture and equation show that the Padis family ate $\frac{2}{6}$ of the whole pan of lasagna for lunch.

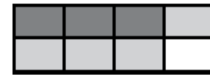
- 1 Look at the example problem. Felix says if $\frac{2}{3}$ part of lasagna had been left over from dinner and the Padis family ate $\frac{1}{2}$ of that for lunch, the answer would not change, they would still eat $\frac{2}{6}$ of the whole pan of lasagna for lunch. Is he right? Explain.

$\frac{2}{3} \times \frac{1}{2} = \frac{1}{2} \times \frac{2}{3}$ (Commutative property)
 Yes he is right.



Solve.

- 2 Look at the area model. Which of the following products is represented by the model? Circle the letter for all that apply.



- A $\frac{1}{2} \times \frac{3}{4}$ C $\frac{1}{2}$ of $\frac{3}{4}$
 B $\frac{1}{2} \times \frac{1}{3}$ D $\frac{2}{4} \times \frac{2}{4}$

- 3 What is $\frac{1}{2}$ of $\frac{3}{4}$? $\frac{3}{8}$

- 4 Miguel's physical education class lasts for $\frac{3}{4}$ of an hour. Today they spent $\frac{3}{4}$ of that time playing dodge ball. What fraction of an hour did he spend playing dodge ball?

Show your work.

$$\frac{3}{4} \text{ of } \frac{3}{4} =$$

$$\frac{3}{4} \times \frac{3}{4} = \frac{9}{16} \text{ of an hour}$$

Solution:

he spent $\frac{9}{16}$ of an hour playing dodge ball.

- 5 Maggie and her friend visit a beach that has a shoreline $2\frac{2}{5}$ kilometers long. They walk along $\frac{2}{3}$ of it. How many kilometers of the beach shoreline do they walk?

Show your work.

$$2\frac{2}{5} \times \frac{2}{3}$$

$$\frac{12}{5} \times \frac{2}{3} = \frac{24}{15} = 1\frac{9}{15} = 1\frac{3}{5}$$

They walk $1\frac{3}{5}$ kilometers.

Solution: _____

Lesson 17

Name: _____

Use Unit Fractions in Division

Study the example problem showing dividing a whole number by a unit fraction. Then solve problems 1–6.

Example

Teams of students in Mr. Reed’s classroom are presenting Social Studies projects. Each team has $\frac{1}{5}$ hour for their presentation. How many projects are presented in 2 hours?

The 2 large rectangles represent the 2 hours.

Each presentation is $\frac{1}{5}$ hour so each rectangle is divided into 5 equal sections.



From the model you can write the division equation: $2 \div \frac{1}{5} = 10$

You can also write the multiplication equation: $2 \times 5 = 10$

Both equations show 10 projects are presented in 2 hours.

1 Explain how the model in the example problem shows

$2 \div \frac{1}{5} = 10.$

The model shows that if each presentation is $\frac{1}{5}$ of an hour, 10 presentations can fill a 2 hour block (5 projects per hour)

2 Explain how the model in the example problem shows

$2 \times 5 = 10.$

This model also shows that each hour will have 5 presenters, making a total of 10 presenters in a 2 hour block.

3 Suppose Mr. Reed’s class has 3 hours for presentations. How many projects can be presented? Show your solution by writing both a division equation and a multiplication equation.

$3 \div \frac{1}{5} = 15$

$3 \times 5 = 15$

Vocabulary

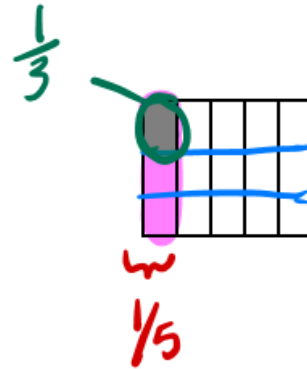
unit fraction a fraction with a numerator of 1.

$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$

Solve.

- 4** Mr. Reed put 3 students on each team. The teams divide the $\frac{1}{5}$ hour presentation time so that each student talks an equal amount of time. Complete the steps to find what fraction of the presentation time each student talks.

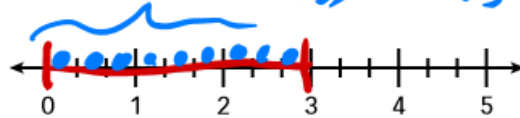
- Use the rectangle at the right. Shade $\frac{1}{5}$ of the rectangle to show $\frac{1}{5}$ hour, the time of one presentation.
- Divide the rectangle into 3 equal parts to represent the 3 students.
- Shade $\frac{1}{3}$ of the rectangle to represent 1 student.
- What is the fraction of the presentation time each student talks? $\frac{1}{15}$ of an hour
- $\frac{1}{5} \div 3 = \underline{\frac{1}{15}}$



- 5** Look at the model in problem 4. Write the multiplication equation you can also use to find $\frac{1}{3}$ of $\frac{1}{5}$.

$$\underline{\frac{1}{5} \times \frac{1}{3} = \frac{1}{15}}$$

- 6** Use the number line to find $3 \div \frac{1}{3}$. Then write the related multiplication equation that also solves the problem. 9 thirds ($\frac{1}{3}$) = $\frac{1}{3}$



$$3 \div \frac{1}{3} = \underline{9}$$

$$\underline{3} \times \underline{3} = \underline{9}$$

Reason and Write

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

Example

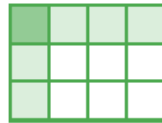
Draw a model to represent $\frac{1}{4} \div 3$. Write a multiplication equation that could also describe the model. Explain how you drew the model and how it represents both the multiplication and division equation.

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

Possible answer shown.

$$\frac{1}{4} \div 3 = \frac{1}{12}$$

$$\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$$



I drew an area model to show $\frac{1}{4} \div 3$. I split a rectangle into 4 equal columns, to show fourths. I shaded one of the columns to show $\frac{1}{4}$. To divide $\frac{1}{4}$ by 3, I divided the model into three equal rows and shaded the top one to show dividing by 3. By making 4 columns and 3 rows, I split the area model into 12 equal parts. The dark green area is 1 of the 12 parts, so it shows $\frac{1}{12}$.

The area model also shows the multiplication equation $\frac{1}{4} \times \frac{1}{3}$. The model is divided into 4 columns with 1 column shaded, representing $\frac{1}{4}$. The model has 3 rows with 1 row shaded, representing $\frac{1}{3}$. The dark green section where they overlap is the product of $\frac{1}{4}$ and $\frac{1}{3}$ and is 1 out of 12 equal parts, or $\frac{1}{12}$.

Where does the example ...

- show a model?
- use a multiplication equation?
- use words to explain?
- use numbers to explain?

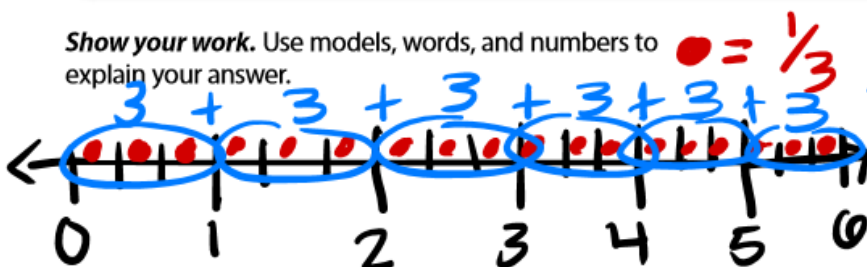


Solve the problem. Use what you learned from the example.

Example

Draw a model to represent $6 \div \frac{1}{3}$. Write a multiplication equation that could also describe the model. Explain how you drew the model and how it represents both the multiplication and division equation.

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



Did you ...

- show a model?
- use a multiplication equation?
- use words to

* I drew a number line to show $6 \div \frac{1}{3}$. This shows that 3 thirds equal 1 whole; if that's the case, then there are 18 thirds all together if 6 wholes are divided into thirds.

* If there are 3 thirds in each whole, then 3×6 wholes would make a total of 18 thirds ($\frac{1}{3}$).

explain?

- use numbers to explain?

