

Show What You Know



Check your understanding of important skills.

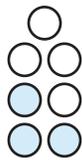
Name _____

► **Part of a Group** Write a fraction that names the shaded part.

1. total counters _____

shaded counters _____

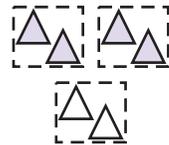
fraction _____



2. total groups _____

shaded groups _____

fraction _____



► **Relate Multiplication and Division** Use inverse operations and fact families to solve.

3. Since $6 \times 4 = 24$,

then _____ $\div 4 = 6$.

5. Since $9 \times 3 = \underline{\hspace{2cm}}$,

then _____ $\div 3 = 9$.

4. Since _____ $\times 8 = 56$,

then _____ $\div 7 = 8$.

6. Since _____ $\div 4 = 10$,

then $4 \times 10 = \underline{\hspace{2cm}}$.

► **Equivalent Fractions** Write an equivalent fraction.

7. $\frac{16}{20}$ _____

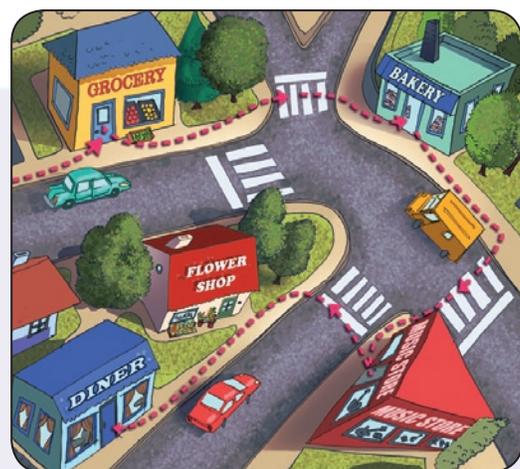
8. $\frac{3}{8}$ _____

9. $\frac{5}{12}$ _____

10. $\frac{25}{45}$ _____



Emily spent $\frac{1}{2}$ of her money at the grocery store. Then, she spent $\frac{1}{2}$ of what was left at the bakery. Next, at the music store, she spent $\frac{1}{2}$ of what was left on a CD that was on sale. She spent the remaining \$6.00 on lunch at the diner. Be a Math Detective and find how much money Emily started with.



Vocabulary Builder

Visualize It

Complete the flow map using the review words.

Review Words

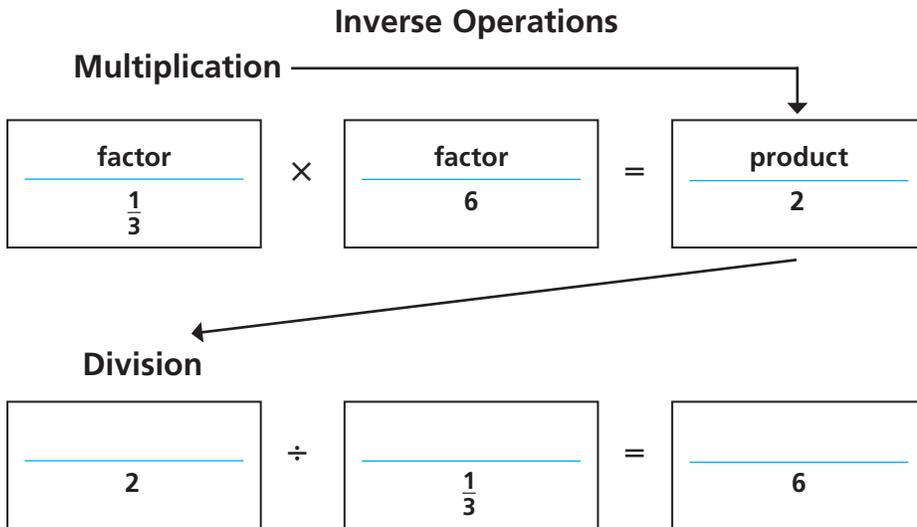
dividend

divisor

equation

fraction

quotient



Understand Vocabulary

Complete the sentences using the review words.

- The number that divides the dividend is the _____.
- An algebraic or numerical sentence that shows that two quantities are equal is an _____.
- A number that names a part of a whole or a part of a group is called a _____.
- The _____ is the number that is to be divided in a division problem.
- The _____ is the number, not including the remainder, that results from dividing.

Name _____

Divide Fractions and Whole Numbers

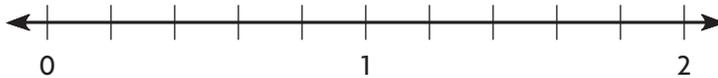
Essential Question How do you divide a whole number by a fraction and divide a fraction by a whole number?

Investigate

Materials ■ fraction strips

A. Mia walks a 2-mile fitness trail. She stops to exercise every $\frac{1}{5}$ mile. How many times does Mia stop to exercise?

- Draw a number line from 0 to 2. Divide the number line into fifths. Label each fifth on your number line.



- Skip count by fifths from 0 to 2 to find $2 \div \frac{1}{5}$.

There are _____ one-fifths in 2 wholes.

You can use the relationship between multiplication and division to explain and check your solution.

- Record and check the quotient.

$$2 \div \frac{1}{5} = \underline{\hspace{2cm}} \text{ because } \underline{\hspace{2cm}} \times \frac{1}{5} = 2.$$

So, Mia stops to exercise _____ times.

B. Roger has 2 yards of string. He cuts the string into pieces that are $\frac{1}{3}$ yard long. How many pieces of string does Roger have?

- Model 2 using 2 whole fraction strips.
- Then place enough $\frac{1}{3}$ strips to fit exactly under the 2 wholes. There are _____ one-third-size pieces in 2 wholes.
- Record and check the quotient.

$$2 \div \frac{1}{3} = \underline{\hspace{2cm}} \text{ because } \underline{\hspace{2cm}} \times \frac{1}{3} = 2.$$

So, Roger has _____ pieces of string.



Draw Conclusions

1. When you divide a whole number by a fraction, how does the quotient compare to the dividend? **Explain.**

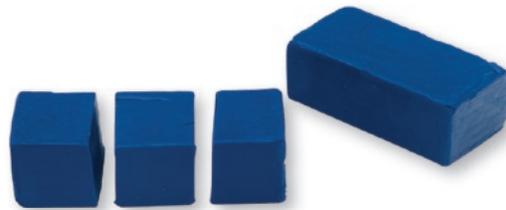
2. **Explain** how knowing the number of fifths in 1 could help you find the number of fifths in 2.

3. **Describe** how you would find $4 \div \frac{1}{5}$.

Make Connections

You can use fraction strips to divide a fraction by a whole number.

Calia shares half of a package of clay equally among herself and each of 2 friends. What fraction of the whole package of clay will each friend get?



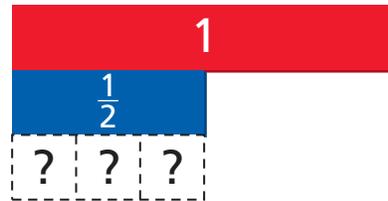
STEP 1 Place a $\frac{1}{2}$ strip under a 1-whole strip to show the $\frac{1}{2}$ package of clay.

STEP 2 Find 3 fraction strips, all with the same denominator, that fit exactly under the $\frac{1}{2}$ strip.

Each piece is _____ of the whole.

STEP 3 Record and check the quotient.

$$\frac{1}{2} \div 3 = \underline{\hspace{1cm}} \text{ because } \underline{\hspace{1cm}} \times 3 = \frac{1}{2}.$$



Think: How much of the whole is each piece when $\frac{1}{2}$ is divided into 3 equal pieces?

So, each friend will get _____ of the whole package of clay.

Math Talk

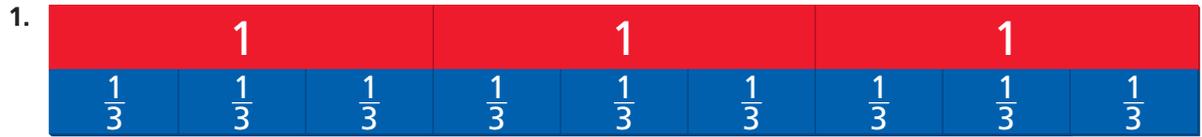
MATHEMATICAL PRACTICES

When you divide a fraction by a whole number, how does the quotient compare to the dividend? **Explain.**

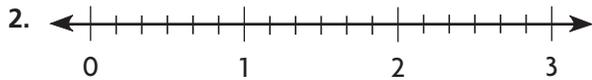
Name _____

Share and Show

Divide and check the quotient.

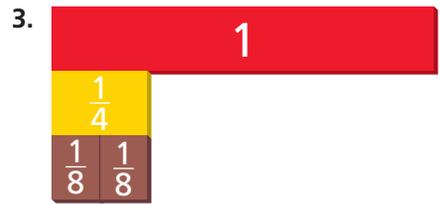


$3 \div \frac{1}{3} = \underline{\quad}$ because $\underline{\quad} \times \frac{1}{3} = 3$.



Think: What label should I write for each tick mark?

$3 \div \frac{1}{6} = \underline{\quad}$ because
 $\underline{\quad} \times \frac{1}{6} = 3$.



$\frac{1}{4} \div 2 = \underline{\quad}$ because
 $\underline{\quad} \times 2 = \frac{1}{4}$.

Divide. Draw a number line or use fraction strips.

4. $1 \div \frac{1}{3} = \underline{\quad}$

 5. $3 \div \frac{1}{4} = \underline{\quad}$

 6. $\frac{1}{5} \div 2 = \underline{\quad}$

7. $2 \div \frac{1}{2} = \underline{\quad}$

8. $\frac{1}{4} \div 3 = \underline{\quad}$

9. $5 \div \frac{1}{2} = \underline{\quad}$

10. $4 \div \frac{1}{2} = \underline{\quad}$

11. $\frac{1}{6} \div 2 = \underline{\quad}$

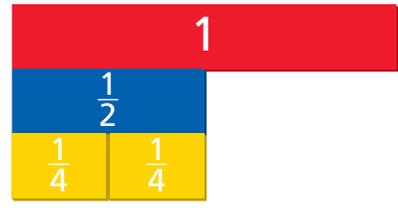
12. $3 \div \frac{1}{5} = \underline{\quad}$

Problem Solving

H.O.T. Sense or Nonsense?

13. Emilio and Julia used different ways to find $\frac{1}{2} \div 4$. Emilio used a model to find the quotient. Julia used a related multiplication equation to find the quotient. Whose answer makes sense? Whose answer is nonsense? **Explain** your reasoning.

Emilio's Work



$$\frac{1}{2} \div 4 = \frac{1}{4}$$

Julia's Work

If $\frac{1}{2} \div 4 = \square$, then $\square \times 4 = \frac{1}{2}$.

I know that $\frac{1}{8} \times 4 = \frac{1}{2}$.

So, $\frac{1}{2} \div 4 = \frac{1}{8}$ because $\frac{1}{8} \times 4 = \frac{1}{2}$.

• For the answer that is nonsense, describe how to find the correct answer.

• If you were going to find $\frac{1}{2} \div 5$, **explain** how you would find the quotient using fraction strips.

Name _____

Problem Solving • Use Multiplication

Essential Question How can the strategy *draw a diagram* help you solve fraction division problems by writing a multiplication sentence?

UNLOCK the Problem REAL WORLD

Erica makes 6 submarine sandwiches and cuts each sandwich into thirds. How many $\frac{1}{3}$ -size sandwich pieces does she have?



Read the Problem

What do I need to find?

I need to find _____

_____.

What information do I need to use?

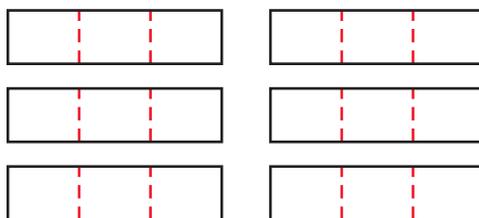
I need to use the size of each _____ of sandwich and the number of _____ she cuts.

How will I use the information?

I can _____ to organize the information from the problem. Then I can use the organized information to find _____
_____.

Solve the Problem

Since Erica cuts 6 submarine sandwiches, my diagram needs to show 6 rectangles to represent the sandwiches. I can divide each of the 6 rectangles into thirds.



To find the total number of thirds in the 6 rectangles, I can multiply the number of thirds in each rectangle by the number of rectangles.

$$6 \div \frac{1}{3} = 6 \times \underline{\quad} = \underline{\quad}$$

So, Erica has _____ one-third-size sandwich pieces.

Math Talk **MATHEMATICAL PRACTICES** **Explain** how you can use multiplication to check your answer.

Try Another Problem

Roberto is cutting 3 blueberry pies into halves to give to his neighbors. How many neighbors will get a $\frac{1}{2}$ -size pie piece?



Read the Problem

What do I need to find?

What information do I need to use?

How will I use the information?

Solve the Problem

So, _____ neighbors will get a $\frac{1}{2}$ -size pie piece.

- **Explain** how the diagram you drew for the division problem helps you write a multiplication sentence.

Name _____

Share and Show

1. A chef has 5 blocks of butter. Each block weighs 1 pound. She cuts each block into fourths. How many $\frac{1}{4}$ -pound pieces of butter does the chef have?

First, draw rectangles to represent the blocks of butter.

Then, divide each rectangle into fourths.



Finally, multiply the number of fourths in each block by the number of blocks.

So, the chef has _____ one-fourth-pound pieces of butter.

-  2. **What if** the chef had 3 blocks of butter and cut the blocks into thirds? How many $\frac{1}{3}$ -pound pieces of butter would the chef have?

3. Jason has 2 pizzas that he cuts into fourths. How many $\frac{1}{4}$ -size pizza slices does he have?

4. Thomas makes 5 sandwiches that he cuts into thirds. How many $\frac{1}{3}$ -size sandwich pieces does he have?

-  5. Holly cuts 3 pans of brownies into eighths. How many $\frac{1}{8}$ -size brownie pieces does she have?

 **SHOW YOUR WORK**

On Your Own

Choose a STRATEGY

- Act It Out
- Draw a Diagram
- Make a Table
- Solve a Simpler Problem
- Work Backward
- Guess, Check, and Revise

6. Julie wants to make a drawing that is $\frac{1}{4}$ the size of the original. If a tree in the original drawing is 8 inches tall, how tall will the tree in Julie's drawing be?

7. Three friends go to a book fair. Allen spends \$2.60. Maria spends 4 times as much as Allen. Akio spends \$3.45 less than Maria. How much does Akio spend?

8.  Brianna has a sheet of paper that is 6 feet long. She cuts the length of paper into sixths and then cuts the length of each of these $\frac{1}{6}$ pieces into thirds. How many pieces does she have? How many inches long is each piece?

9.  **Pose a Problem** Look back at Problem 8. Write a similar problem by changing the length of the paper and the size of the pieces.

10. **Test Prep** Adrian made 3 carrot cakes. He cut each cake into fourths. How many $\frac{1}{4}$ -size cake pieces does he have?

- (A) 16
- (B) 12
- (C) $1\frac{1}{3}$
- (D) 1

SHOW YOUR WORK 

Name _____

Connect Fractions to Division**Essential Question** How does a fraction represent division?**CONNECT** A fraction can be written as a division problem.

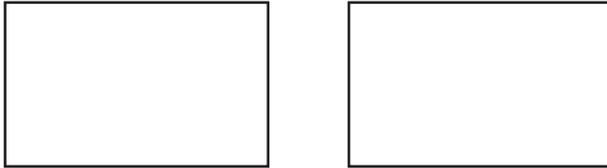
$$\frac{3}{4} = 3 \div 4$$

$$\frac{12}{2} = 12 \div 2$$



There are 3 students in a crafts class and 2 sheets of construction paper for them to share equally. What part of the construction paper will each student get?

 Use a drawing.

Divide. $2 \div 3$ **STEP 1** Draw lines to divide each piece of paper into 3 equal pieces.

Each student's share of one sheet of construction paper is _____.

STEP 2 Count the number of thirds each student gets. Since there are 2 sheets of construction paper, each student willget 2 of the _____, or $2 \times$ _____.**STEP 3** Complete the number sentence.

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

STEP 4 Check your answer.

Since _____ \times _____ = _____, the quotient is correct.
 quotient divisor dividend

So, each student will get _____ of a sheet of construction paper.

- Circle the dividend.
- Underline the divisor.

Math Talk **Describe** a division problem where each student gets $\frac{3}{4}$ of a sheet of construction paper.

Example

Four friends share 6 granola bars equally. How many granola bars does each friend get?

Divide. $6 \div 4$

STEP 1 Draw lines to divide each of the 6 bars into fourths.

Each friend's share of 1 granola bar is _____.

STEP 2 Count the number of fourths each friend gets. Since there are 6 granola bars, each friend will

get _____ of the fourths, or _____.

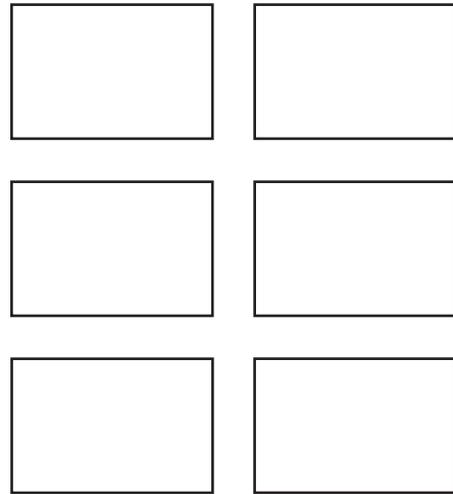
STEP 3 Complete the number sentence. Write the fraction as a mixed number in simplest form.

$6 \div 4 = \frac{\quad}{\quad}$, or $\frac{\quad}{\quad}$

STEP 4 Check your answer.

Since _____ $\times 4 =$ _____, the quotient is correct.

So, each friend will get _____ granola bars.



Math Talk

MATHEMATICAL PRACTICES

Describe a different way the granola bars could have been divided into 4 equal shares.

Try This!

Ms. Ruiz has a piece of string that is 125 inches long. For a science experiment, she divides the string equally among 8 groups of students. How much string will each group get?

You can represent this problem as a division equation or a fraction.

- Divide. Write the remainder as a fraction. $125 \div 8 =$ _____
- Write $\frac{125}{8}$ as a mixed number in simplest form. $\frac{125}{8} =$ _____

So, each group will get _____ inches of string.

- **Explain** why $125 \div 8$ gives the same result as $\frac{125}{8}$.

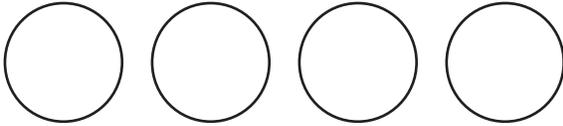
Name _____

Share and Show



Draw lines on the model to complete the number sentence.

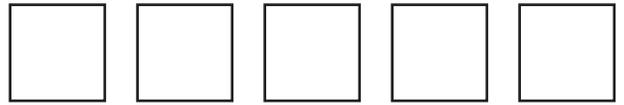
1. Six friends share 4 pizzas equally.



$$4 \div 6 = \underline{\hspace{2cm}}$$

Each friend's share is _____ of a pizza.

2. Four brothers share 5 sandwiches equally.



$$5 \div 4 = \underline{\hspace{2cm}}$$

Each brother's share is _____ sandwiches.

Complete the number sentence to solve.

3. Twelve friends share 3 pies equally. What fraction of a pie does each friend get?

$$3 \div 12 = \underline{\hspace{2cm}}$$

Each friend's share is _____ of a pie.

4. Three students share 8 blocks of clay equally. How much clay does each student get?

$$8 \div 3 = \underline{\hspace{2cm}}$$

Each student's share is _____ blocks of clay.

Math Talk

MATHEMATICAL PRACTICES

Explain how you can check your answer.

On Your Own

Complete the number sentence to solve.

5. Four students share 7 oranges equally. How many oranges does each student get?

$$7 \div 4 = \underline{\hspace{2cm}}$$

Each student's share is _____ oranges.

6. Eight girls share 5 fruit bars equally. What fraction of a fruit bar does each girl get?

$$5 \div 8 = \underline{\hspace{2cm}}$$

Each girl's share is _____ of a fruit bar.

7. Nine friends share 6 pizzas equally. What fraction of a pizza does each friend get?

$$6 \div 9 = \underline{\hspace{2cm}}$$

Each friend's share is _____ of a pizza.

8. Two boys share 9 feet of rope equally. How many feet of rope does each boy get?

$$9 \div 2 = \underline{\hspace{2cm}}$$

Each boy's share is _____ feet of rope.

Problem Solving **REAL WORLD**



SHOW YOUR WORK

9. Shawna has 3 adults and 2 children coming over for dessert. She is going to serve 2 small apple pies. If she plans to give each person, including herself, an equal amount of pie, how much pie will each person get?

10. There are 36 members in the math club. Addison brought 81 brownies to share with all the members. How many brownies does each member get?

11. **H.O.T.** Eight students share 12 oatmeal muffins equally and 6 students share 15 apple muffins equally. Carmine is in both groups of students. What is the total number of muffins Carmine gets?

12. **Write Math** Nine friends order 4 large pizzas. Four of the friends share 2 pizzas equally and the other 5 friends share 2 pizzas equally. In which group does each member get a greater amount of pizza? **Explain** your reasoning.

13. **Test Prep** Jason baked 5 cherry pies. He wants to share them equally among 3 of his neighbors. How many pies will each neighbor get?

- (A) $\frac{3}{8}$
- (B) $\frac{3}{5}$
- (C) $1\frac{2}{3}$
- (D) $2\frac{2}{3}$



Mid-Chapter Checkpoint

► Concepts and Skills

1. **Explain** how you can tell, without computing, whether the quotient $\frac{1}{2} \div 6$ is greater than 1 or less than 1.

Divide. Draw a number line or use fraction strips.

2. $3 \div \frac{1}{2} =$ _____

3. $1 \div \frac{1}{4} =$ _____

4. $\frac{1}{2} \div 2 =$ _____

5. $\frac{1}{3} \div 4 =$ _____

6. $2 \div \frac{1}{6} =$ _____

7. $\frac{1}{4} \div 3 =$ _____

Complete the number sentence to solve.

8. Two students share 3 granola bars equally. How many granola bars does each student get?

$$3 \div 2 = \underline{\hspace{2cm}}$$

Each student's share is _____ granola bars.

9. Five girls share 4 sandwiches equally. What fraction of a sandwich does each girl get?

$$4 \div 5 = \underline{\hspace{2cm}}$$

Each girl's share is _____ of a sandwich.

10. Nine boys share 4 pizzas equally. What fraction of a pizza does each boy get?

$$4 \div 9 = \underline{\hspace{2cm}}$$

Each boy's share is _____ of a pizza.

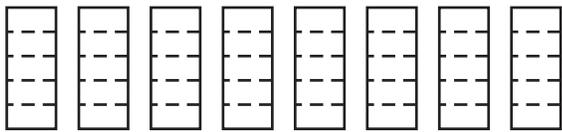
11. Four friends share 10 cookies equally. How many cookies does each friend get?

$$10 \div 4 = \underline{\hspace{2cm}}$$

Each friend's share is _____ cookies.

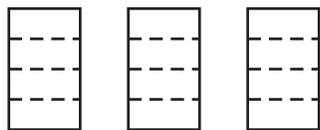
Fill in the bubble completely to show your answer.

12. Carmine has 8 liters of punch for a party. Each glass holds $\frac{1}{5}$ liter of punch. How many glasses can Carmine fill with punch?



- (A) $\frac{5}{8}$ (C) 13
(B) $1\frac{3}{5}$ (D) 40

13. Four friends share 3 fruit bars equally. What fraction of a fruit bar does each friend get?



- (A) $\frac{3}{7}$ (C) $1\frac{1}{3}$
(B) $\frac{3}{4}$ (D) $2\frac{1}{3}$

14. Caleb and 2 friends are sharing $\frac{1}{2}$ quart of milk equally. What fraction of a quart of milk does each of the 3 friends get?

- (A) $\frac{3}{2}$ quarts
(B) $\frac{2}{3}$ quart
(C) $\frac{1}{4}$ quart
(D) $\frac{1}{6}$ quart

15. Makayla has 3 yards of ribbon to use for a craft project. She cuts the ribbon into pieces that are $\frac{1}{4}$ yard long. How many pieces of ribbon does Makayla have?

- (A) $1\frac{1}{4}$ (C) 7
(B) $2\frac{1}{3}$ (D) 12

Name _____

Fraction and Whole-Number Division

Essential Question How can you divide fractions by solving a related multiplication sentence?

UNLOCK the Problem REAL WORLD



Three friends share a $\frac{1}{4}$ -pound block of fudge equally. What fraction of a pound of fudge does each friend get?

Divide. $\frac{1}{4} \div 3$

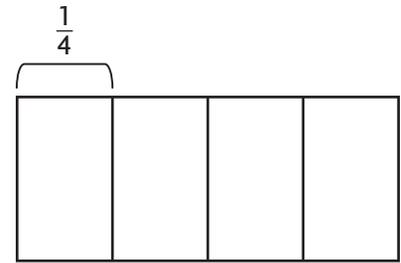
- Let the rectangle represent a 1-pound block of fudge. Divide the rectangle into fourths and then divide each fourth into three equal parts.

The rectangle is now divided into _____ equal parts.

- When you divide one fourth into 3 equal parts, you are finding one of three equal parts or $\frac{1}{3}$ of $\frac{1}{4}$. Shade $\frac{1}{3}$ of $\frac{1}{4}$.

The shaded part is _____ of the whole rectangle.

- Complete the number sentence.



$$\frac{1}{4} \div 3 = \frac{1}{3} \times \frac{1}{4} = \underline{\hspace{2cm}}$$

So, each friend gets _____ of a pound of fudge.

Example

Brad has 9 pounds of ground turkey to make turkey burgers for a picnic. How many $\frac{1}{3}$ -pound turkey burgers can he make?

Divide. $9 \div \frac{1}{3}$

- Draw 9 rectangles to represent each pound of ground turkey. Divide each rectangle into thirds.
- When you divide the _____ rectangles into thirds, you are finding the number of thirds in 9 rectangles or finding 9 groups of _____. There are _____ thirds.
- Complete the number sentence.

- Will the number of turkey burgers be less than or greater than 9?



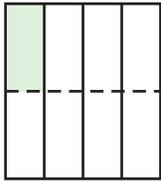
$$9 \div \frac{1}{3} = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

So, Brad can make _____ one-third-pound turkey burgers.

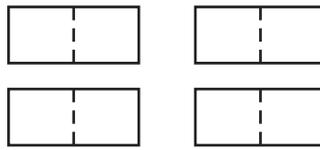
CONNECT You have learned how to use a model and write a multiplication sentence to solve a division problem.

Examples

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



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



1. Look at Example A. **Describe** how the model shows that dividing by 2 is the same as multiplying by $\frac{1}{2}$.

2. Look at Example B. **Describe** how the model shows that dividing by $\frac{1}{2}$ is the same as multiplying by 2.

When you divide whole numbers, the quotient is always less than the dividend. For example, the quotient for $6 \div 2$ is less than 6 and the quotient for $2 \div 3$ is less than 2. Complete the Try This! to learn how the quotient compares to the dividend when you divide fractions and whole numbers.

Try This!

For the two expressions below, which will have a quotient that is greater than its dividend? **Explain.**

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

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

So, when I divide a fraction by a whole number, the quotient is _____ the dividend. When I divide a whole number by a fraction less than 1,

the quotient is _____ the dividend.

Name _____

Share and Show

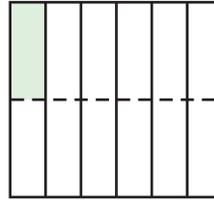


1. Use the model to complete the number sentence.



$$2 \div \frac{1}{4} = 2 \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

2. Use the model to complete the number sentence.



$$\frac{1}{6} \div 2 = \underline{\hspace{1cm}} \times \frac{1}{6} = \underline{\hspace{1cm}}$$

Write a related multiplication sentence to solve.

3. $3 \div \frac{1}{4}$

4. $\frac{1}{5} \div 4$

5. $\frac{1}{9} \div 3$

6. $7 \div \frac{1}{2}$

On Your Own

Write a related multiplication sentence to solve.

7. $5 \div \frac{1}{3}$

8. $8 \div \frac{1}{2}$

9. $\frac{1}{7} \div 4$

10. $\frac{1}{2} \div 9$

11. $\frac{1}{3} \div 4$

12. $\frac{1}{4} \div 12$

13. $6 \div \frac{1}{5}$

14.  $\frac{2}{3} \div 3$

UNLOCK the Problem REAL WORLD

15. The slowest mammal is the three-toed sloth. The top speed of a three-toed sloth on the ground is about $\frac{1}{4}$ foot per second. The top speed of a giant tortoise on the ground is about $\frac{1}{3}$ foot per second. How much longer would it take a three-toed sloth than a giant tortoise to travel 10 feet on the ground?



- (A) 10 seconds (C) 40 seconds
- (B) 30 seconds (D) 70 seconds

- a. What do you need to find? _____
- b. What operations will you use to solve the problem? _____
- c. Show the steps you used to solve the problem.

d. Complete the sentences.

A three-toed sloth would travel 10 feet in _____ seconds.

A giant tortoise would travel 10 feet in _____ seconds.

Since _____ - _____ = _____, it would take a three-toed sloth _____ seconds longer to travel 10 feet.

e. Fill in the bubble for the correct answer choice.

16. Robert divides 8 cups of almonds into $\frac{1}{8}$ -cup servings. How many servings does he have?
- (A) 1 (C) 8
 - (B) 16 (D) 64

17. Tina cuts $\frac{1}{3}$ yard of fabric into 4 equal parts. What is the length of each part?
- (A) 12 yards (C) $\frac{3}{4}$ yard
 - (B) $1\frac{1}{3}$ yards (D) $\frac{1}{12}$ yard

Name _____

Interpret Division with Fractions**Essential Question** How can you use diagrams, equations, and story problems to represent division?

Elizabeth has 6 cups of raisins. She divides the raisins into $\frac{1}{4}$ -cup servings. How many servings does she have?

You can use diagrams, equations, and story problems to represent division.

**Draw a diagram to solve.**

- Draw 6 rectangles to represent the cups of raisins. Draw lines to divide each rectangle into fourths.
- To find $6 \div \frac{1}{4}$, count the total number of fourths in the 6 rectangles.

$$6 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

So, Elizabeth has servings.

**Example 1** Write an equation to solve.

Four friends share $\frac{1}{4}$ of a gallon of orange juice. What fraction of a gallon of orange juice does each friend get?

STEP 1

Write an equation.

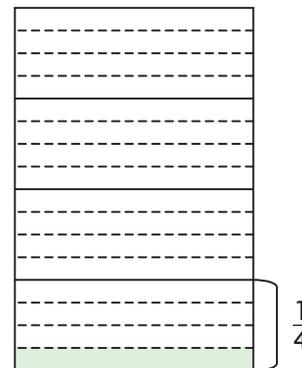
$$\frac{1}{4} \div \underline{\hspace{2cm}} = n$$

STEP 2

Write a related multiplication equation. Then solve.

$$\frac{1}{4} \times \underline{\hspace{2cm}} = n$$

$$\underline{\hspace{2cm}} = n$$



So, each friend will get of a gallon of orange juice.



Example 2 Write a story problem. Then draw a diagram to solve.

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

STEP 1 Choose the item you want to divide.

Think: Your problem should be about how many groups of $\frac{1}{3}$ are in 4 wholes.

Possible items: 4 sandwiches, 4 feet of ribbon, 4 pies



STEP 2 Write a story problem to represent $4 \div \frac{1}{3}$ using the item you chose. Describe how it is divided into thirds. Then ask how many thirds there are.

STEP 3 Draw a diagram to solve.

$$4 \div \frac{1}{3} = \underline{\hspace{2cm}}$$



Example 3 Write a story problem. Then draw a diagram to solve.

$$\frac{1}{2} \div 5$$

STEP 1 Choose the item you want to divide.

Think: Your problem should describe $\frac{1}{2}$ of an item that can be divided into 5 equal parts.

Possible items: $\frac{1}{2}$ of a pizza, $\frac{1}{2}$ of a yard of rope, $\frac{1}{2}$ of a gallon of milk

STEP 2 Write a story problem to represent $\frac{1}{2} \div 5$ using the item you chose. Describe how it is divided into 5 equal parts. Then ask about the size of each part.

STEP 3 Draw a diagram to solve.

$$\frac{1}{2} \div 5 = \underline{\hspace{2cm}}$$

Math Talk

MATHEMATICAL PRACTICES

Explain how you decided what type of diagram to draw for your problem.

Name _____

Share and Show



1. Complete the story problem to represent $3 \div \frac{1}{4}$.

Carmen has a roll of paper that is _____ feet long. She cuts

the paper into pieces that are each _____ foot long. How many pieces of paper does Carmen have?

2. Draw a diagram to represent the problem. Then solve.

April has 6 fruit bars. She cuts the bars into halves. How many $\frac{1}{2}$ -size bar pieces does she have?

3. Write an equation to represent the problem. Then solve.

Two friends share $\frac{1}{4}$ of a large peach pie. What fraction of the whole pie does each friend get?

On Your Own

4. Write an equation to represent the problem. Then solve.

Benito has $\frac{1}{3}$ -kilogram of grapes. He divides the grapes equally into 3 bags. What fraction of a kilogram of grapes is in each bag?

5. Draw a diagram to represent the problem. Then solve.

Sonya has 5 sandwiches. She cuts each sandwich into fourths. How many $\frac{1}{4}$ -size sandwich pieces does she have?

6. Write a story problem to represent $2 \div \frac{1}{8}$. Then solve.

Problem Solving REAL WORLD

H.O.T. Pose a Problem

7. Amy wrote the following problem to represent $4 \div \frac{1}{6}$.

Jacob has a board that is 4 feet long. He cuts the board into pieces that are each $\frac{1}{6}$ foot long. How many pieces does Jacob have now?

Then Amy drew this diagram to solve her problem.



So, Jacob has 24 pieces.

Write a new problem using a different item to be divided and different fractional pieces. Then draw a diagram to solve your problem.

Pose a problem.

Blank area with horizontal lines for writing a problem.

Draw a diagram to solve your problem.

Blank area for drawing a diagram to solve the problem.

8. **Test Prep** Melvin has $\frac{1}{4}$ of a gallon of fruit punch. He shares the punch equally with each of 2 friends and himself. Which equation represents the fraction of a gallon of punch that each of the friends get?

- (A) $\frac{1}{4} \div \frac{1}{3} = n$
- (B) $\frac{1}{4} \div 3 = n$
- (C) $3 \div \frac{1}{4} = n$
- (D) $3 \div 4 = n$



Name _____



Chapter Review/Test

► Concepts and Skills

Divide. Draw a number line or use fraction strips.

1. $2 \div \frac{1}{3} =$ _____

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

3. $\frac{1}{4} \div 3 =$ _____

Complete the number sentence to solve.

4. Three students share 4 sandwiches equally. How many sandwiches does each student get?

$4 \div 3 =$ _____

Each student's share is _____ sandwiches.

5. Six girls share 5 pints of milk equally. What fraction of a pint of milk does each girl get?

$5 \div 6 =$ _____

Each girl's share is _____ pint of milk.

Write a related multiplication sentence to solve.

6. $\frac{1}{4} \div 5$

7. $\frac{1}{3} \div 9$

8. $8 \div \frac{1}{2}$

9. $5 \div \frac{1}{6}$

10. Write a story problem to represent $\frac{1}{2} \div 3$. Then solve.

11. Write a story problem to represent $3 \div \frac{1}{2}$. Then solve.

Fill in the bubble completely to show your answer.

12. Michelle cuts $\frac{1}{4}$ yard of ribbon into 4 equal pieces. What is the length of each piece?
- (A) $\frac{1}{16}$ yard
- (B) $\frac{1}{8}$ yard
- (C) 1 yard
- (D) 16 yards
13. Ashton picked 6 pounds of pecans. He wants to share the pecans equally among 5 of his neighbors. How many pounds of pecans will each neighbor get?
- (A) $\frac{5}{11}$ pound
- (B) $\frac{5}{6}$ pound
- (C) $1\frac{1}{5}$ pounds
- (D) $2\frac{1}{5}$ pounds
14. Isabella has 5 pounds of trail mix. She divides the mix into $\frac{1}{4}$ -pound servings. How many $\frac{1}{4}$ -pound servings does she have?
- (A) $1\frac{1}{4}$
- (B) 9
- (C) 16
- (D) 20
15. Melvin has $\frac{1}{2}$ of a cake. He shares the cake equally with each of 2 friends and himself. Which equation represents the fraction of the whole cake that each of the friends get?
- (A) $\frac{1}{2} \div \frac{1}{3} = n$
- (B) $\frac{1}{2} \div 3 = n$
- (C) $2 \div \frac{1}{3} = n$
- (D) $2 \div 3 = n$

Name _____

Fill in the bubble completely to show your answer.

16. Camille has 8 feet of rope. She cuts the rope into $\frac{1}{3}$ -foot pieces for a science project. How many $\frac{1}{3}$ -foot pieces of rope does she have?

(A) 24

(B) 8

(C) 3

(D) $2\frac{2}{3}$

17. Awan makes 3 sandwiches and cuts each sandwich into sixths. How many $\frac{1}{6}$ -size sandwich pieces does he have?

(A) $\frac{1}{2}$

(B) 2

(C) 9

(D) 18

18. Eight students share 5 blocks of modeling clay equally. What fraction of one block of modeling clay does each student get?

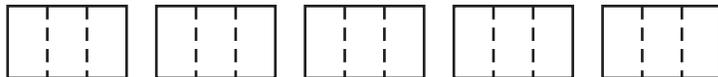
(A) $\frac{1}{40}$

(B) $\frac{1}{8}$

(C) $\frac{5}{8}$

(D) $1\frac{3}{5}$

19. The diagram below represents which division problem?



(A) $5 \div \frac{1}{3}$

(B) $\frac{1}{3} \div 5$

(C) $5 \div \frac{1}{4}$

(D) $\frac{1}{4} \div 5$

► Constructed Response

20. Dora buys one package each of the 1-pound, 2-pound, and 4-pound packages of ground beef to make hamburgers. How many $\frac{1}{4}$ -pound hamburgers can she make? Show your work using words, pictures, or numbers.

Explain how you found your answer.

► Performance Task

21. Suppose your teacher gives you the division problem $6 \div \frac{1}{5}$.

A In the space below, draw a diagram to represent $6 \div \frac{1}{5}$.

B Write a story problem to represent $6 \div \frac{1}{5}$.

C Use a related multiplication expression to solve your story problem. Show your work.

D Write a division problem that shows a unit fraction divided by a whole number. Write a story problem to represent your division problem. Then solve.

Geometry and Measurement

Developing
understanding of volume



A lunar rover is a surface exploration vehicle used on the moon. ►

Project

Space Architecture

NASA's Lunar Architecture Team develops ideas for rovers and space habitats. A space habitat is made up of modules linked by airlocks. Airlocks are double doors that allow people to move between the modules without losing atmosphere.

Get Started

Work with a partner to design a space habitat made up of 3 modules. The Important Facts name some modules that you can choose for your design. Cut out, fold, and tape the patterns for each of the modules that you have selected, and for the measuring cube.

Use a formula to find the volume of the measuring cube in cubic centimeters. Estimate the volume of each module by filling it with rice, then pouring the rice into the measuring cube. Let every cubic centimeter in the measuring cube represent 32 cubic feet. Determine what the volume of your space habitat would be in cubic feet.

Connect the modules to complete your space habitat.

Completed by _____

Important Facts

Modules of a Space Habitat

- sleeping room
- kitchen
- exercise room
- bathroom
- work room
- airlock
- life-support room (for air and water supplies)

