Chapter 11

Name _____

Divide Fractions

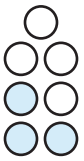
Show What You Know

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

1. total counters _____

   shaded counters _____

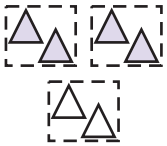
   fraction _____



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 _____ $\div 4 = 6$.

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

   then _____ $\div 7 = 8$.

5. Since $9 \times 3 =$ _____,

   then _____ $\div 3 = 9$.

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

   then $4 \times 10 =$ _____.

Equivalent Fractions Write an equivalent fraction.

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

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

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

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

MATH in the Real World

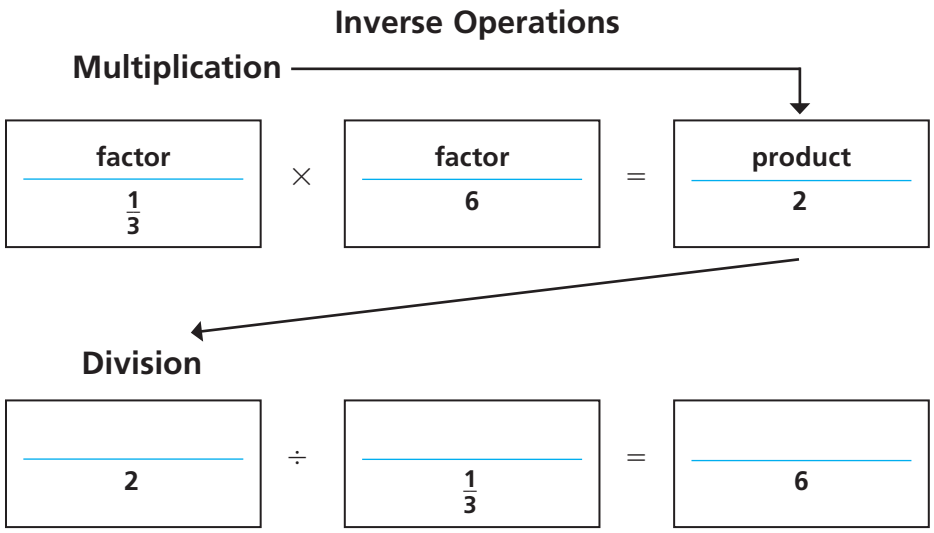
Emily spent $\frac{1}{2}$ of her money at the grocery store. Then, she spent $\frac{1}{2}$ of what was left at the bakery. Next, at the music store, she spent $\frac{1}{2}$ of what was left on a CD that was on sale. She spent the remaining $6.00 on lunch at the diner. Find how much money Emily started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

Vocabulary Builder

Go Online For more help

Visualize It

Complete the flow map using the review words.



Connect to Vocabulary

Review Words

dividend
divisor
equation
fraction
quotient

Understand Vocabulary

Complete the sentences using the review words.

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

Name _____

Divide Whole Numbers and Unit Fractions

Florida's B.E.S.T.

- **Fractions** 5.FR.2.4
- **Algebraic Reasoning** 5.AR.1.2, 5.AR.1.3, 5.AR.2.3
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.4.1, MTR.5.1

I Can 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.

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

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.

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

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.

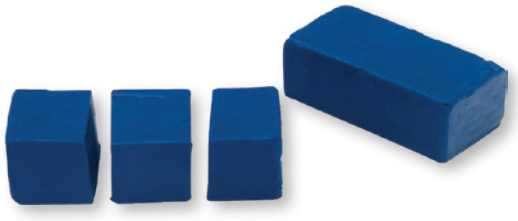
2. MTR Explain how knowing the number of fifths in 1 could help you find the number of fifths in 2.

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

Make Connections

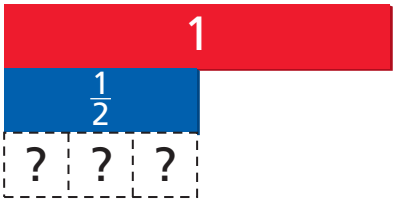
You can use fraction strips to divide a fraction by a whole number.

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.

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

STEP 3 Record and check the quotient.

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

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

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

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

Name _____

Share and Show

Math Board

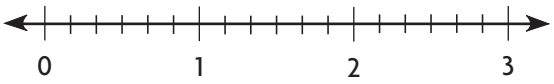
Divide. Check the quotient.

1.

1			1			1		
$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

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

2.

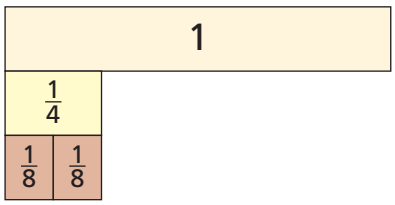


Think: What label should I write for each of the smaller marks?

$3 \div \frac{1}{6} =$ _____ because

_____ $\times \frac{1}{6} = 3$.

3.



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

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

Divide. Draw a number line or use fraction strips.

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

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

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

On Your Own

7. Luke has $\frac{1}{3}$ of a package of dried apricots. He divides the dried apricots equally into 3 small bags. Luke gives one of the bags to a friend and keeps the other two bags for himself. What fraction of the original package of dried apricots did Luke keep for himself?

_____

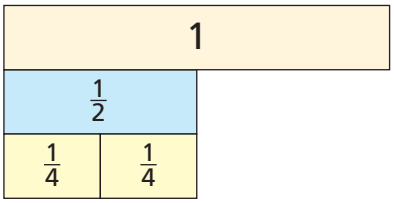
8. For 8a–8e, select True or False for each equation.

8a.	$4 \div \frac{1}{3} = \frac{1}{12}$	○ True	○ False
8b.	$6 \div \frac{1}{2} = 12$	○ True	○ False
8c.	$\frac{1}{8} \div 2 = 16$	○ True	○ False
8d.	$\frac{1}{3} \div 4 = \frac{1}{12}$	○ True	○ False
8e.	$\frac{1}{5} \div 3 = 15$	○ True	○ False

9. 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.

MATH on the Spot

Emilio's Work



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

Julia's Work

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

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.

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

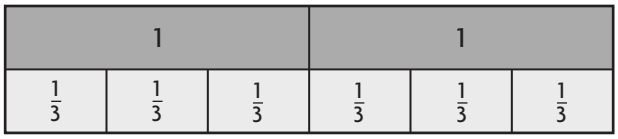
Name _____

Divide Whole Numbers and Unit Fractions

Go Online
Interactive Examples

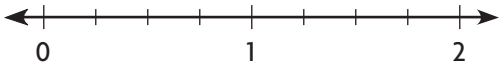
Divide and check the quotient.

1.



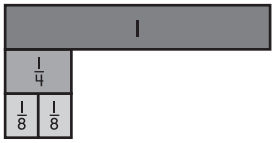
$2 \div \frac{1}{3} =$ 6 because 6 $\times \frac{1}{3} = 2$.

2.



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

3.



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

Divide. Draw a number line or use fraction strips.

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

5. $\frac{1}{6} \div 3 =$ _____

6. $4 \div \frac{1}{6} =$ _____

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

8. $\frac{1}{4} \div 6 =$ _____

9. $5 \div \frac{1}{4} =$ _____

Problem Solving Real World

10. Thuy can run $\frac{1}{10}$ mile per minute. How many minutes will it take Thuy to run 3 miles?

_____

11. Derrick has 3 yards of ribbon to use for wrapping gifts. He cuts the ribbon into pieces that are $\frac{1}{4}$ yard long. How many pieces of ribbon does Derrick have?

_____

12. WRITE Math Explain how you could use a model to find the quotient $4 \div \frac{1}{3}$.

_____

_____

Lesson Check

13. Olivia cuts half of a loaf of bread into 4 equal parts. What fraction of the whole loaf does each of the 4 parts represent?

14. When you divide a fraction less than 1 by a whole number greater than 1, is the quotient less than, greater than, or equal to the dividend?

Spiral Review

15. A recipe for chicken and rice calls for $3\frac{1}{2}$ pounds of chicken. Paola wants to adjust the recipe so that it yields $1\frac{1}{2}$ times as much chicken and rice. How much chicken will she need?

16. Kelvin and Oola share a small pizza. Kelvin eats $\frac{2}{3}$ of the pizza. Oola eats half as much of the pizza as Kelvin does. What fraction of the pizza does Oola eat?

17. In gym class, you run $\frac{3}{5}$ mile. Your coach runs 10 times that distance each day. How far does your coach run each day?

18. Sterling plants a tree that is $4\frac{3}{4}$ feet tall. One year later, the tree is $5\frac{2}{5}$ feet tall. How many feet did the tree grow?

Name _____

Relate Multiplication and Division of Fractions

Florida's B.E.S.T.

- **Fractions** 5.FR.2.4
- **Algebraic Reasoning** 5.AR.1.2, 5.AR.1.3, 5.AR.2.3
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.4.1, MTR.5.1, MTR.6.1, MTR.7.1

I Can use diagrams and multiplication to solve fraction division problems.

UNLOCK the Problem

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?

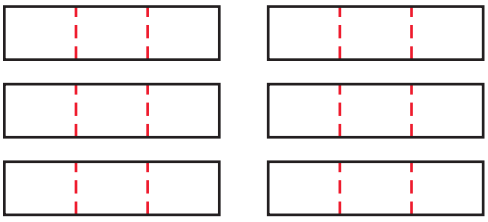
I can _____ to organize the information from the problem. Then I can use the organized information to find

_____

_____.

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.

$6 \div \frac{1}{3} = 6 \times$ _____ = _____

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

Math Talk

MTR 6.1 Assess the reasonableness of solutions.

Describe 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 $\frac{1}{2}$ of a pie?

Read the Problem	Solve the Problem
What do I need to find?	
What information do I need to use?	
How will I use the information?	

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

- MTR Explain how the diagram you drew for the division problem helps you write a multiplication equation.

_____

_____

Name _____

Share and Show

Math Board

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. Ninon cuts 3 ribbons into eighths for a craft project. How many $\frac{1}{8}$-size pieces of ribbon does she have?

_____

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

_____

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

_____

Show the Math

Demonstrate Your Thinking

On Your Own

6. Julie wants to make a drawing that is $\frac{1}{4}$ the size of the original drawing. Sahil makes a drawing that is $\frac{1}{3}$ the size of the original. A tree in the original drawing is 12 inches tall. What will be the difference between the height of the tree in Julie's and Sahil's drawings?

MATH on the Spot

_____

7. For 7a–7c, select whether each equation is True or False.

7a. $8 \times \frac{1}{4} = 2$ ○ True ○ False

7b. $3 = 4 \div \frac{1}{12}$ ○ True ○ False

7c. $6 \div \frac{1}{3} = 24 - 6$ ○ True ○ False

7d. Explain your reasoning for your answer to 7c? _____

_____

8. Merla 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. MTR Look back at Problem 8. Write a similar problem by changing the length of the paper and the size of the pieces.

_____

_____

_____

_____

_____

10. Adrian made 3 granola bars. He cut each bar into fourths. How many $\frac{1}{4}$-size pieces of granola bar does Adrian have? Draw lines in the model to find the answer.

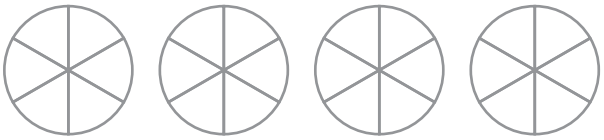
Adrian has _____ one-quarter-size pieces of granola bar.

Name _____

Relate Multiplication and Division of Fractions

Go Online
Interactive Examples

1. Sebastian bakes 4 pies and cuts each pie into sixths. How many $\frac{1}{6}$-size pie slices does he have?



To find the total number of sixths in the 4 pies, multiply the number of sixths in each pie by the number of pies. $4 \div \frac{1}{6} = 4 \times 6 = 24$ one-sixth-pie slices

2. Ali has 2 vegetable pizzas that she cuts into eighths. How many $\frac{1}{8}$-size pieces does she have?

_____

3. A baker has 6 loaves of bread. Each loaf weighs 1 pound. He cuts each loaf into thirds. How many $\frac{1}{3}$-pound loaves of bread does the baker now have?

_____

4. Suppose the baker has 4 loaves of bread and cuts the loaves into halves. How many $\frac{1}{2}$-pound loaves of bread would the baker have?

_____

5. Madalyn has 3 watermelons that she cuts into halves to give to her neighbors. How many neighbors will get a $\frac{1}{2}$-size piece of watermelon?

_____

6. For 6a–6c, select whether each equation is True or False.

6a. $6 \times \frac{1}{3} = 18$ ○ True ○ False

6b. $20 = 5 \div \frac{1}{4}$ ○ True ○ False

6c. $6 + 2 = 4 \div \frac{1}{2}$ ○ True ○ False

7. WRITE Math Draw a diagram and explain how you can use it to find $3 \div \frac{1}{5}$.

_____

_____

Lesson Check

8. Lucetta has 12 pieces of fabric and cuts each piece into fourths. How many $\frac{1}{4}$-size pieces of fabric does she have?

9. Josue has 3 chicken pot pies that he cuts into thirds. How many $\frac{1}{3}$-size chicken pot pies pieces does he have?

Spiral Review

10. Add. $\frac{2}{4} + \frac{4}{3}$

11. L'Oréal uses 12.5 pounds of potatoes to make mashed potatoes. She uses one-tenth as many pounds of butter as potatoes. How many pounds of butter does L'Oréal use?

12. Ivette collects perfume bottles. She has 99 bottles in her collection. Two-thirds of her perfume bottles are made of crystal. How many of the perfume bottles in Ivettes collection are made of crystal?

13. Horatio buys a melon and divides it into 6 equal-size servings. He eats $\frac{1}{3}$ of the melon over the weekend. How many servings of melon does Horatio eat over the weekend?

Name _____

Interpret a Fraction as Division

Florida's B.E.S.T.

- **Fractions** 5.FR.1.1
- **Algebraic Reasoning** 5.AR.1.2
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.4.1, MTR.5.1, MTR.6.1, MTR.7.1

I Can interpret fractions with division.

MTR A fraction can be written as a division problem.

$\frac{3}{4} = 3 \div 4$ $\frac{12}{2} = 12 \div 2$

UNLOCK the Problem Real World

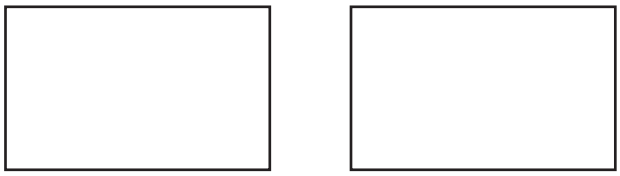
There are 3 students in a crafts class and 2 sheets of construction paper for them to share equally. What part of the construction paper will each student get?

- Circle the dividend.
- Underline the divisor.

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 will get. Since there are 2 sheets of construction paper, each student will

get 2 of the _____, or $2 \times$ _____.

STEP 3 Complete the equation.

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

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.

Math Talk

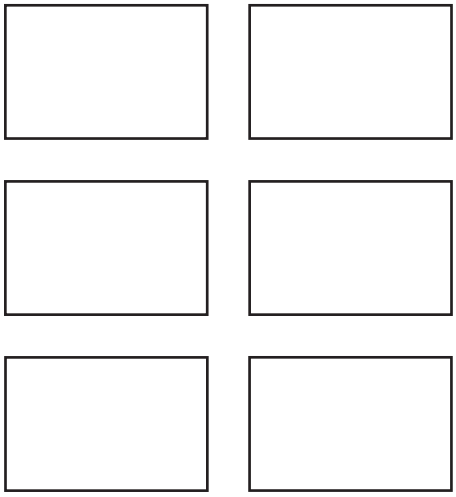
MTR 1.1 **Actively participate in effortful learning.**

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

Example

Four friends share 6 sheets of poster board equally. How many sheets of poster board does each friend get?

Divide. $6 \div 4$



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

Each friend's share of 1 sheet is _____.

STEP 2 Count the number of fourths each friend gets. Since there are 6 sheets of poster board, each friend will get _____ of the fourths, or $\frac{\square}{\square}$.

STEP 3 Complete the equation. Write the fraction as a mixed number.

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

STEP 4 Check your answer.

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

So, each friend will get _____ sheets of poster board.

Math Talk

MTR 2.1 Demonstrate understanding in multiple ways.

Describe a different way the sheets of poster board 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. $\frac{125}{8} =$ _____

So, each group will get _____ inches of string.

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

_____

_____

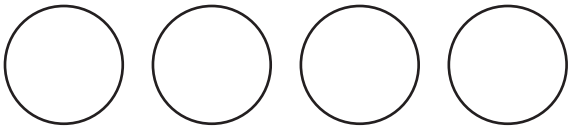
Name _____

Share and Show

Math Board

Draw lines on the model to complete the equation.

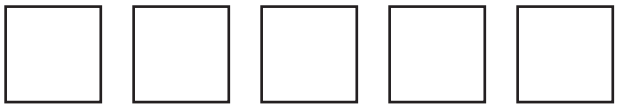
1. Six friends share 4 small pizzas equally.



$4 \div 6 =$ _____

Each friend's share is _____ of a pizza.

2. Four brothers share 5 packs of stickers equally.



$5 \div 4 =$ _____

Each brother's share is _____ packs of stickers.

Complete the equation to solve.

3. Twelve friends share 3 melons equally. What fraction of a melon does each friend get?

$3 \div 12 =$ _____

Each friend's share is _____ of a melon.

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

$8 \div 3 =$ _____

Each student's share is _____ blocks of clay.

Math Talk

MTR 6.1 Assess the reasonableness of solutions.

Explain how you can check your answer.

On Your Own

Complete the equation to solve.

5. Four students share 7 feet of ribbon equally. How many feet of ribbon does each student get?

$7 \div 4 =$ _____

Each student's share is _____ feet of ribbon.

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

$5 \div 8 =$ _____

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

7. Eight students share 12 mini oatmeal muffins equally and 6 students share 15 mini apple muffins equally. Carmine is in both groups of students. What is the total number of mini muffins Carmine gets?

_____

MATH on the Spot

Problem Solving · Applications

8. Shawna has 3 adults and 2 children coming over. 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?

_____

9. Quiterie brought 9 pounds of oranges and 7 pounds of cherries to make fruit salad for a fund raiser. She wants to package an equal amount of fruit salad into each of 12 containers. How much fruit salad should Quiterie put in each container?

_____

10. MTR 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.

_____

_____

_____

_____

_____

11. Telford has 5 zucchinis he grew in a garden. He wants to share them equally among 3 of his neighbors. How many zucchinis will each neighbor get? Use the numbers to complete the equation. You may use a number more than once or not at all.

$$\square \div \square = \frac{\square}{\square} = \square \frac{\square}{\square}$$

1	2	3	4	5

Name _____

Interpret a Fraction as Division

Go Online
Interactive Examples

Complete the equation to solve.

1. Six students share 8 apples equally. How many apples does each student get?

   $8 \div 6 =$ $\frac{8}{6}$, or $1\frac{2}{6}$

2. Ten boys share 7 cereal bars equally. What fraction of a cereal bar does each boy get?

   $7 \div 10 =$ _____

3. Eight friends share 12 burritos equally. How many burritos does each friend get?

   $12 \div 8 =$ _____

4. Three girls share 8 yards of fabric equally. How many yards of fabric does each girl get?

   $8 \div 3 =$ _____

5. Five bakers share 2 loaves of bread equally. What fraction of a loaf of bread does each baker get?

   $2 \div 5 =$ _____

6. Nine friends share 6 bananas equally. What fraction of a banana does each friend get?

   $6 \div 9 =$ _____

Problem Solving Real World

7. There are 12 students in a jewelry-making class and 8 sets of charms. What fraction of a set of charms will each student get?

8. Five friends share 6 fruit snacks equally. How many fruit snacks will each friend get?

9. WRITE Math Sezni divides 8 pounds of dog food equally among 6 dogs. Draw a diagram and explain how you can use it to find the amount of food each dog receives.

Lesson Check

10. Four friends share 8 bunches of grapes equally. How many bunches of grapes will each friend get?

11. Ten students share 8 pieces of poster board equally. What fraction of a piece of poster board does each student get?

Spiral Review

12. Arturo has a log that is 4 yards long. He cuts the log into pieces that are $\frac{1}{3}$-yard long. How many pieces will Arturo have?

13. Vu has 2 pizzas that he cuts into sixths. How many $\frac{1}{6}$-size pieces does he have?

14. Kayaks rent for $35 per day. Write an expression using the Distributive Property that can help you find the cost in dollars of renting 3 kayaks for a day.

15. Louisa is 152.7 centimeters tall. Her younger sister is 8.42 centimeters shorter than she is. How tall is Louisa's younger sister?

Name _____

Fraction and Whole-Number Division

I Can divide fractions by solving a related multiplication equation.

Florida's B.E.S.T.
- **Fractions** 5.FR.2.4
- **Algebraic Reasoning** 5.AR.1.2, 5.AR.1.3
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.5.1

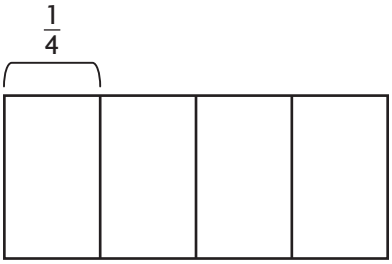
UNLOCK the Problem

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

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

- Let the rectangle represent 1 pound of beads. 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 equation.

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

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

Example

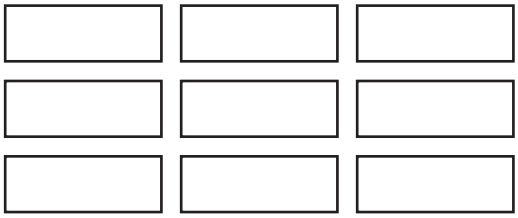
Brad has 9 pounds of ground turkey to make turkey burgers for a picnic. How many $\frac{1}{3}$-pound turkey burgers can he make?

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

  _____

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 equation.

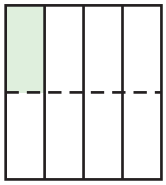
$9 \div \frac{1}{3} =$ _____ $\times$ _____ $=$ _____

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

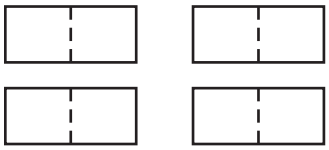
MTR You have learned how to use a model and write a multiplication equation to solve a division problem.

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 by whole numbers greater than 1, 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. Learn below 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.

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

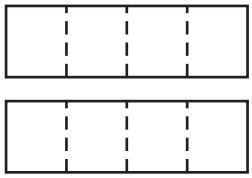
So, when I divide a fraction by a whole number greater than 1, the quotient is _____ the dividend. When I divide a whole number by a fraction less than 1, the quotient is _____ the dividend.

Name _____

Share and Show

Math Board

1. Use the model to complete the equation.



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

Write a related multiplication equation to solve.

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

_____

3. $7 \div \frac{1}{2}$

_____

On Your Own

Write a related multiplication equation to solve.

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

_____

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

_____

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

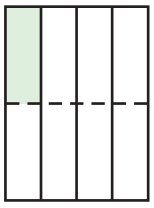
_____

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

_____

8. MTR Describe how the model shows that dividing by 2 is the same as finding $\frac{1}{2}$ of $\frac{1}{4}$.

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



_____

_____

_____

9. Mrs. Lia has 12 pounds of modeling clay. She divides the clay into $\frac{1}{2}$-pound blocks. If Mrs. Lia sets aside 6 of the blocks and gives the rest to the students in her art class, how many $\frac{1}{2}$-pound blocks of clay does Mrs. Lia give to her class?

_____

Problem Solving • Applications

10. 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?

MATH on the Spot

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.

11. Jamie has a striped fabric that is 5 yards long and a solid fabric that is 4 yards long. Jamie cuts the striped fabric into equal pieces that are $\frac{1}{4}$ yard long and the solid fabric into equal pieces that are $\frac{1}{3}$ yard long. How many more pieces of striped fabric does Jamie have than pieces of solid fabric? Explain how you solved the problem.

_____

_____

_____

_____

Name _____

Fraction and Whole-Number Division

Go Online
Interactive Examples

Write a related multiplication equation to solve.

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

$3 \times 2 = 6$

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

3. $2 \div \frac{1}{8}$

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

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

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

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

8. $6 \div \frac{1}{5}$

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

10. $4 \div \frac{1}{8}$

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

12. $9 \div \frac{1}{2}$

Problem Solving Real World

13. Isaac has a piece of rope that is 5 yards long. Into how many $\frac{1}{2}$-yard pieces of rope can Isaac cut the rope?

14. Two friends share $\frac{1}{2}$ of a pineapple equally. What fraction of a whole pineapple does each friend get?

15. WRITE Math Tell whether the quotient is greater than or less than the dividend when you divide a whole number by a fraction. Explain your reasoning.

Lesson Check

16. Sean divides 8 cups of granola into $\frac{1}{4}$-cup servings. How many servings of granola does he have?

17. Skylar solved $\frac{1}{6} \div 5$ by using a related multiplication expression. What multiplication expression did she use?

Spiral Review

18. Nine friends share 12 pounds of pecans equally. How many pounds of pecans does each friend get?

19. A scientist has $\frac{2}{3}$ liter of solution. He uses $\frac{1}{2}$ of the solution for an experiment. How much solution does the scientist use for the experiment?

20. Naomi needs 2 cups of chopped apples for a fruit salad she is making. She only has a $\frac{1}{4}$-cup measuring cup. How many times will Naomi need to fill the measuring cup to get 2 cups of apples?

21. Michaela catches 3 fish, which weigh a total of $19\frac{1}{2}$ pounds. One fish weighs $7\frac{5}{8}$ pounds and another weighs $5\frac{3}{4}$ pounds. How much does the third fish weigh?

Name _____

Use Visual Models and Equations to Represent Division with Fractions

Florida's B.E.S.T.

- **Fractions** 5.FR.2.4
- **Algebraic Reasoning** 5.AR.1.2, 5.AR.1.3
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.4.1, MTR.5.1

I Can use diagrams, equations, and story problems to represent division.

UNLOCK the Problem

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

- How many $\frac{1}{4}$-cups are in 1 cup?

_____

- How many cups of raisins does Elisa 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.

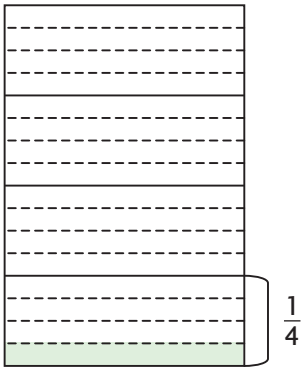
- To find $6 \div \frac{1}{4}$, count the total number of fourths in the 6 rectangles.

$6 \div$ _____ $=$ _____

So, Elisa 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.

$\frac{1}{4} \div$ _____ $= n$

STEP 2

Write a related multiplication equation. Then solve.

_____ $\times \frac{1}{4} = n$

_____ $= n$

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 apples

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.

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

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.

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

Math Talk

MTR 5.1 Use patterns and structure

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

Name _____

Share and Show

Math Board

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.

Destiny 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

MATH on the Spot

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 and gives away 6 pieces. How many $\frac{1}{4}$-size sandwich pieces does she have now?

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

Problem Solving · Applications

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

Alim 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 Alim have now?

Then Reem drew this diagram to solve her problem.

So, Alim 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.

Draw a diagram to solve your problem.

8. Melvin has $\frac{1}{4}$ 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 3 friends will get? Mark all that apply.

Ⓐ $\frac{1}{4} \div \frac{1}{3} = n$

Ⓑ $\frac{1}{3} \times \frac{1}{4} = n$

Ⓒ $3 \div \frac{1}{4} = n$

Ⓓ $3 \div 4 = n$

Ⓔ $\frac{1}{4} \div 3 = n$

Ⓕ $3 \times \frac{1}{4} = n$

Name _____

Use Visual Models and Equations to Represent Division with Fractions

Go Online
Interactive Examples

Write an equation to represent the problem. Then solve.

1. Georges has a piece of wire that is $\frac{1}{2}$ yard long. He cuts the wire into 3 equal pieces. What fraction of a yard is each piece?

$\frac{1}{2} \div 3 = n$; $\frac{1}{3} \times \frac{1}{2} = n$; $n = \frac{1}{6}$; $\frac{1}{6}$ yard

2. Vita has a piece of ribbon that is 5 meters long. She cuts the ribbon into pieces that are each $\frac{1}{3}$ meter long. How many pieces does she cut?

Draw a diagram to represent the problem. Then solve.

3. Leah has 3 muffins. She cuts each muffin into fourths. How many $\frac{1}{4}$-muffin pieces does she have?

4. Two friends share $\frac{1}{4}$ gallon of lemonade equally. What fraction of the gallon of lemonade does each friend get?

5. WRITE Math Write a story problem to represent $3 \div \frac{1}{2}$.

6. WRITE Math Write a story problem to represent $\frac{1}{4} \div 2$.

Problem Solving Real World

7. Spencer has $\frac{1}{3}$ pound of rice. He divides the rice equally into 4 bags. What fraction of a pound of rice is in each bag?

8. Humma has 3 apples. She slices each apple into eighths. How many $\frac{1}{8}$-apple slices does she have?

Lesson Check

9. Abigail has $\frac{1}{2}$ gallon of orange juice. She divides the juice equally into 6 glasses. What equation represents the fraction of a gallon of orange juice in each glass?

10. Write an expression to represent the following situation. Riley has a piece of wire that is 4 yards long. He cuts it into pieces that are $\frac{1}{2}$ yard long. How many pieces of wire does Riley have?

Spiral Review

11. Gia buys $\frac{2}{3}$ pound of roast beef. She uses $\frac{1}{4}$ pound to make a sandwich for lunch. How much roast beef does she have left?

12. Joao buys $2\frac{1}{2}$ pounds of grapes. He buys $1\frac{1}{4}$ times as many pounds of apples as grapes. How many pounds of apples does Joao buy?

13. Ms. Maritza's car has 16 gallons of gas in the tank. She uses $\frac{3}{4}$ of the gas. How many gallons of gas does Ms. Maritza use?

14. Rowan has a board that is 8 feet long. Rowan cuts the board into three equal pieces. How long is each piece?

Name _____

Chapter 11

Chapter Review

1. A builder has an 8-acre plot divided into $\frac{1}{4}$-acre home sites. How many $\frac{1}{4}$-acre home sites are there?

There are ☐ home sites.

2. For numbers 2a–2e, select True or False for each equation.

2a.	$3 \div \frac{1}{4} = \frac{1}{12}$	○ True	○ False
2b.	$7 \div \frac{1}{2} = 14$	○ True	○ False
2c.	$\frac{1}{5} \div 4 = 20$	○ True	○ False
2d.	$\frac{1}{2} \div 5 = \frac{1}{10}$	○ True	○ False
2e.	$\frac{1}{7} \div 3 = 21$	○ True	○ False

3. Twelve pounds of beans are distributed equally into 8 bags to give out at the food bank. How many pounds of beans are in each bag?

_____ pounds

4. Gabriel made 4 small meatloaves. He cut each meatloaf into fourths. How many $\frac{1}{4}$-size pieces of meatloaf does Gabriel have? Draw lines in the model to find the answer.

Gabriel has ☐ $\frac{1}{4}$-size pieces of meatloaf.

5. Five friends share 3 bags of trail mix equally. What fraction of a bag of trail mix does each friend get?

6. Landon and Colin bought $\frac{1}{2}$ pound of strawberries. They are sharing the strawberries equally. Each person will receive ☐ pound of strawberries.

7. Choose the numbers to create a story problem that represents $4 \div \frac{1}{3}$.

Jonah bought [4 / $\frac{1}{3}$ / $\frac{4}{3}$] pounds of cheese.

He made grilled cheese sandwiches and used [4 / $\frac{1}{3}$ / $\frac{4}{3}$] pound of cheese in each sandwich.

Jonah made _____ sandwiches.

8. A giant tortoise can walk about $\frac{1}{10}$ meter per second on land. A northern red-bellied turtle can walk about $\frac{1}{2}$ meter per second on land.

Part A

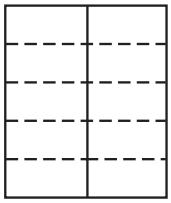
How long would it take a giant tortoise to travel 5 meters? Show your work.

Part B

How much longer would it take a giant tortoise than a northern red-bellied turtle to travel 10 meters on land? Explain how you found your answer.

Name _____

9. Camilla has a $\frac{1}{2}$ pound of raisins that she will divide evenly into 5 bags. Shade the diagram to show the fractional part of a pound that will be in each bag.



10. Mrs. Green wrote the following problem on the whiteboard:

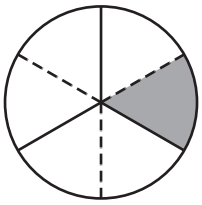
Mia and Frank shared $\frac{1}{3}$ pound of cherries equally. What fractional part of a pound did each person receive?

Part A

Molly wrote the following equation to solve the problem: $2 \div \frac{1}{3} = n$. Do you agree with Molly's equation? Support your answer with information from the problem.

Part B

Noah drew this diagram to solve the problem. Can Noah use his diagram to find the fractional part of a pound of cherries that each person received? Support your answer with information from the problem.



11. Divide. Draw a number line to show your work.

$2 \div \frac{1}{3} =$ ☐

12. Zoe has 5 cucumbers she grew in her garden. She wants to share them equally among 4 of her neighbors. How many cucumbers will each neighbor receive? Use the numbers on the tiles to complete the number sentence. You may use a number more than once or not at all.

1	2	3
4	5	6

☐ ÷ ☐ = $\frac{\square}{\square}$

13. Dora buys one package each of 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.

14. Adan has $\frac{1}{2}$ quart of milk. If he pours the same amount of milk into 3 glasses, each glass will contain ☐ quart of milk.

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

Each friend will get ☐ of a pumpkin pie.

Name _____

16. Jesse is making a pitcher of fruit smoothies that contains 3 cups of orange juice. His measuring cup only holds $\frac{1}{4}$ cup. How many times will Jesse need to fill the measuring cup to get the 3 cups of orange juice?

17. Kayleigh has $\frac{1}{4}$ cup of oil. She pours the same amount into each of 2 oil lamps. Which equation represents the fraction of a cup of oil that is in each oil lamp? Mark all that apply.

Ⓐ $\frac{1}{2} \div \frac{1}{4} = n$

Ⓑ $\frac{1}{4} \times \frac{1}{2} = n$

Ⓒ $2 \div \frac{1}{4} = n$

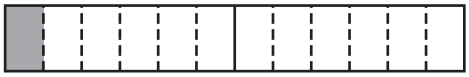
Ⓓ $4 \div 2 = n$

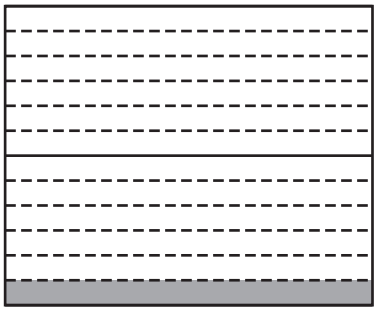
Ⓔ $\frac{1}{4} \div 2 = n$

Ⓕ $2 \times \frac{1}{4} = n$

18. Brendan made a loaf of bread. He gave equal portions of $\frac{1}{2}$ of the loaf of bread to 6 friends. Which diagram could Brendon use to find the fraction of the loaf of bread that each friend received? Mark all that apply.

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

19. Your teacher gives you the problem $6 \div \frac{1}{5}$.

Part A

Draw a diagram to represent $6 \div \frac{1}{5}$.

Part B

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

Part C

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

20. Seven friends picked 7 quarts of blueberries. Three of the friends will share 4 quarts of blueberries equally and the other 4 friends will share 3 quarts of the blueberries equally. In which group does each friend get a greater amount of blueberries? Explain your reasoning.