

Lesson 2.2

October 9, 2013

# WarmUp

Find the quotient.

5.  $56 \div 8 =$  \_\_\_\_\_

6.  $99 \div 11 =$  \_\_\_\_\_

7.  $132 \div 6 =$  \_\_\_\_\_

8.  $80 \div 5 =$  \_\_\_\_\_

9.  $\frac{88}{4} =$  \_\_\_\_\_

10.  $\frac{156}{3} =$  \_\_\_\_\_

11.  $\frac{430}{86} =$  \_\_\_\_\_

12.  $\frac{3082}{23} =$  \_\_\_\_\_

**Homework Review**  
Page 34 in the Big  
Ideas Record and  
Pracce Journal

## 2.1 Record and Practice Journal

Multiply. Write the answer in simplest form.

1.  $\frac{1}{6} \times \frac{5}{8}$   
 $\frac{5}{48}$

2.  $\frac{7}{9} \times 3$   
 $2\frac{1}{3}$

3.  $\frac{8}{9} \times \frac{3}{5}$   
 $\frac{8}{15}$

4.  $\frac{7}{8} \times 2\frac{1}{3}$   
 $2\frac{1}{24}$

5.  $7 \times 3\frac{9}{14}$   
 $25\frac{1}{2}$

6.  $5\frac{5}{9} \times 2\frac{7}{10}$   
 $15$

7. You reserve  $\frac{2}{5}$  of the seats on a tour bus. You are able to fill  $\frac{5}{8}$  of the seats you reserve. What fraction of the seats on the bus are you able to fill?

$\frac{1}{4}$

8. A triangle has a base of  $5\frac{2}{3}$  inches and a height of 3 inches. What is the area of the triangle?

$8\frac{1}{2} \text{ in.}^2$

$$5\frac{5}{9} \cdot 2\frac{7}{10}$$

$$\frac{\cancel{55}^0}{\cancel{9}_1} \cdot \frac{\cancel{27}^3}{\cancel{10}_1} = \frac{15}{1} = 15$$

$$\frac{l \cdot w}{2}$$

$$\frac{1}{2} \cdot 5\frac{2}{3} \cdot 3$$

$$\frac{1}{2} \cdot \frac{17}{3} \cdot \frac{3}{1} = \frac{17}{2}$$

$$8\frac{1}{2} \text{ in}^2$$

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# Essential Question

How can you divide by a fraction?

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# Lesson Target

To be able to:

- use a visual model and a formal rule to divide by a fraction.

## Self-Evaluation Rubric

Score	Description
4	I can teach other students how to use a visual model and a formal rule to divide by a fraction.
3	I can use a visual model and a formal rule to divide by a fraction.
2	I recognize a visual model and a formal rule to divide by a fraction.
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## Activity 1&2

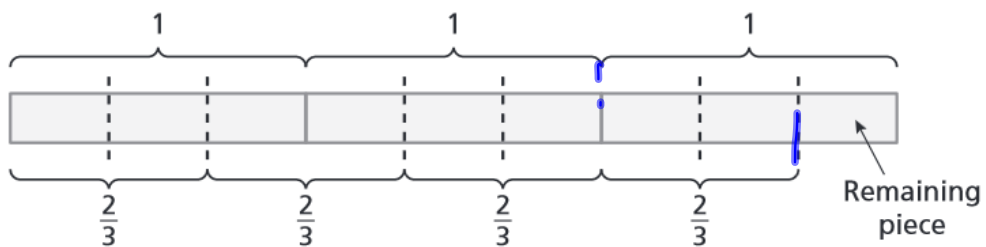
With a partner, complete Activity 1 & 2  
on page 35 - 37 in your Big Ideas  
Record and Practice Journal.

**con·jec·ture** an opinion or conclusion formed on the basis of incomplete information.



a. How many two-thirds are in three?

The division problem is  $3 \div \frac{2}{3}$ .



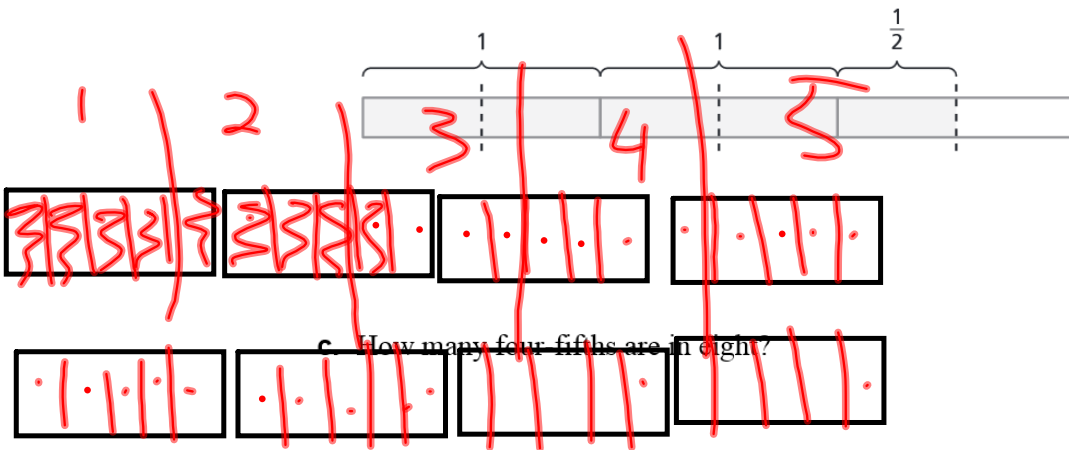
How many groups of  $\frac{2}{3}$  are in 3?  $4$

The remaining piece represents  $\frac{1}{2}$  of  $\frac{2}{3}$ .

So, there are  $4\frac{1}{2}$  groups of  $\frac{2}{3}$  in 3.

So,  $3 \div \frac{2}{3} = 4\frac{1}{2}$ .

b. How many halves are in five halves?



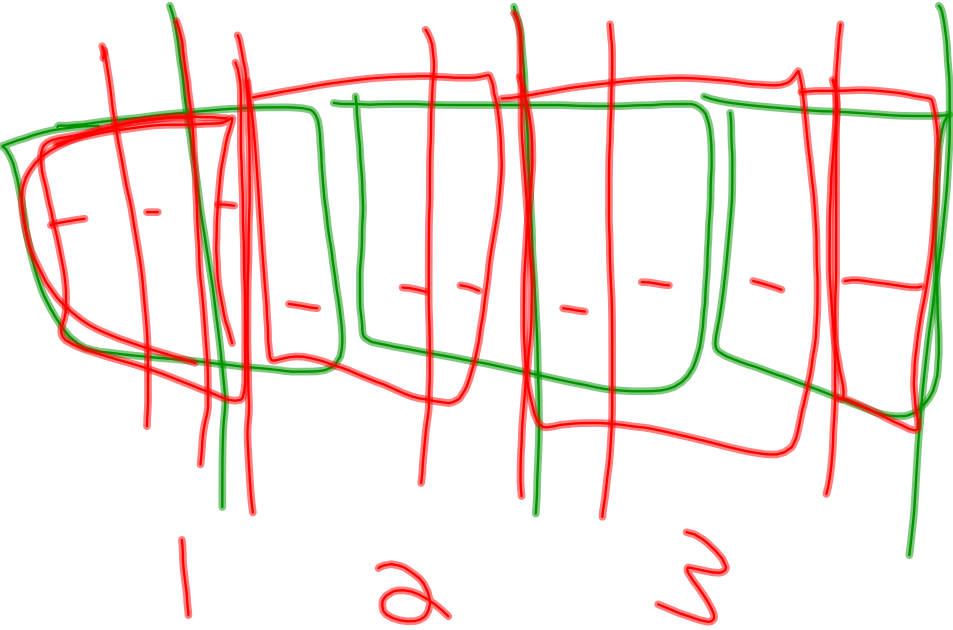
c. How many four-fifths are in eight?

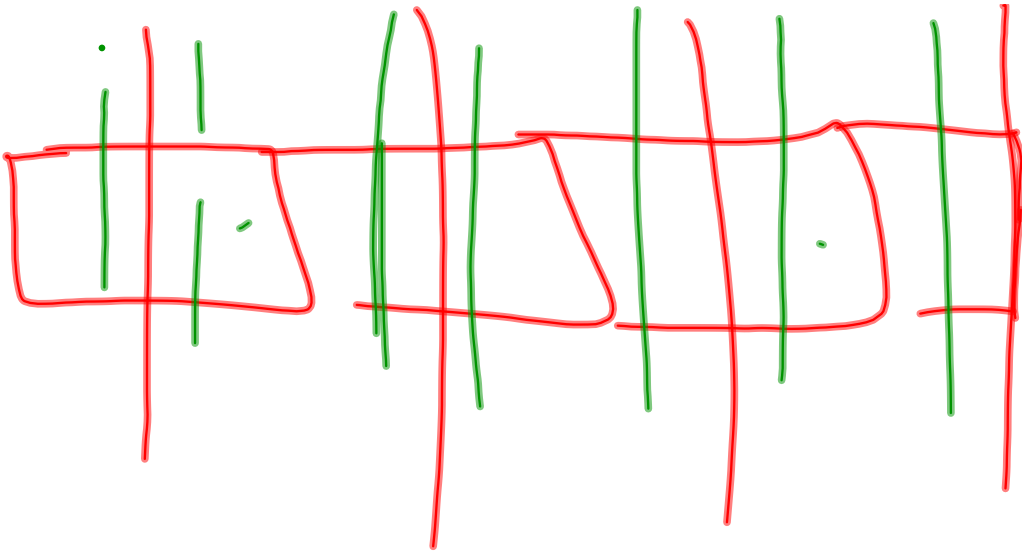
d. How many one-thirds are in seven halves?

e. How many three-fourths are in five halves?



$$\begin{aligned} & \cdot \frac{20}{4} = 5 \\ & \cdot \frac{15}{4} = 3.75 \\ & \cdot \frac{40}{4} = 10 \end{aligned}$$





**Division Table**

$8 \div 16$	$\frac{1}{2}$
$8 \div 8$	1
$8 \div 4$	2
$8 \div 2$	4
$8 \div 1$	8
$8 \div \frac{1}{2}$	16
$8 \div \frac{1}{4}$	32
$8 \div \frac{1}{8}$	64

**Multiplication Table**

$8 \times \frac{1}{16}$	$\frac{1}{2}$
$8 \times \frac{1}{8}$	1
$8 \times \frac{1}{4}$	2
$8 \times \frac{1}{2}$	4
$8 \times 1$	8
$8 \times 2$	16
$8 \times 4$	32
$8 \times 8$	64



Division is  
mult. of the  
reciprocal



## Reciprocals

Two numbers whose product is one.

$$\frac{\cancel{7}}{\cancel{32}} \cdot \frac{\cancel{32}}{\cancel{7}} = 1$$

# Invert

To put upside down or in the opposite position, order, or arrangement.

## The Meaning of a Word ● Invert

When you **invert** a glass, you turn it over.



# 1 Writing Reciprocals

	<i>Original Number</i>	<i>Fraction</i>	<i>Reciprocal</i>	<i>Check</i>
a.	$\frac{3}{5}$	$\frac{3}{5}$	$\frac{5}{3}$	$\frac{3}{5} \times \frac{5}{3} = 1$
b.	$\frac{9}{5}$	$\frac{9}{5}$	$\frac{5}{9}$	$\frac{9}{5} \times \frac{5}{9} = 1$
c.	2	$\frac{2}{1}$	$\frac{1}{2}$	$\frac{2}{1} \times \frac{1}{2} = 1$

# TryIt!

Try numbers 1 - 4 on page 64 of  
your Big Ideas Text Book.

$$4 \div 2 = 2$$

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

$$8 \div 2 = 4$$

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

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

## 2 Dividing a Fraction by a Fraction

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

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

Multiply by the reciprocal of  $\frac{2}{3}$ , which is  $\frac{3}{2}$ .

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

Multiply fractions. Divide out the common factor 3.

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

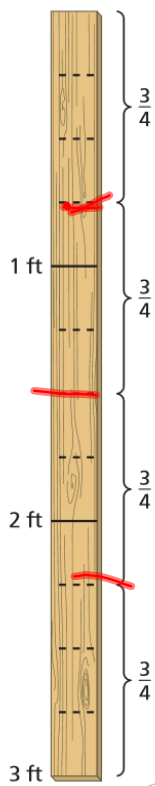
Simplify.



$$4 \div 2 = 2$$
$$2 \div 4 = \frac{1}{2}$$
$$\left( \frac{1}{2} \div \frac{1}{2} \right) = 2$$
$$\frac{4}{2} \cdot \frac{1}{2} = 4 \div 2$$
$$4 \cdot \frac{1}{2}$$

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

**EXAMPLE 3** Dividing a Whole Number by a Fraction



A piece of wood is 3 feet long. How many  $\frac{3}{4}$ -foot pieces can you cut from the piece of wood?

**Method 1:** Draw a diagram. Mark each foot on the diagram. Then divide each foot into  $\frac{1}{4}$ -foot sections.

Count the number of  $\frac{3}{4}$ -foot pieces of wood. There are four.

••• So, you can cut four  $\frac{3}{4}$ -foot pieces from the piece of wood.

**Method 2:** Divide 3 by  $\frac{3}{4}$  to find the number of  $\frac{3}{4}$ -foot pieces.

$$\begin{aligned} 3 \div \frac{3}{4} &= 3 \times \frac{4}{3} \\ &= \frac{1 \cancel{3} \times 4}{\cancel{3} 1} \\ &= 4 \end{aligned}$$

Multiply by the reciprocal of  $\frac{3}{4}$ , which is  $\frac{4}{3}$ .

Multiply. Divide out the common factor 3.

Simplify.

••• So, you can cut four  $\frac{3}{4}$ -foot pieces from the piece of wood.

$$\begin{aligned} 3 &= \frac{3}{1} \\ |N| &= \frac{4}{2} = \frac{4}{1} = 4 \\ 3 &= \frac{12}{4} = \frac{12}{3} \end{aligned}$$

# TryIt!

Try numbers 7 & 9 on page 65  
of your Big Ideas Text Book.

$$\begin{array}{l} \frac{1}{4} \\ \frac{1}{4} \end{array} \div \frac{2}{3} \quad \frac{1}{4} \div \frac{2}{3}$$

win

$$\frac{1}{4} \div \frac{2}{3} = \frac{1}{4} \cdot \frac{3}{2} = \frac{3}{8}$$
$$\frac{1}{4} \div \frac{2}{3} = \frac{3}{8}$$
$$\frac{2}{4} \div \frac{2}{3} = \frac{2}{4} \cdot \frac{3}{2} = \frac{3}{2}$$
$$\frac{2}{4} \div \frac{2}{3} = \frac{3}{2}$$
$$\frac{4}{2} \div \frac{2}{3} = \frac{4}{2} \cdot \frac{3}{2} = 3$$
$$\frac{4}{2} \div \frac{2}{3} = 3$$

$$2 \overline{)4}$$

4

Dividing a Fraction by a Whole Number

Find  $\frac{4}{5} \div 2$ .

$$\frac{4}{5} \div 2 = \frac{4}{5} \div \frac{2}{1}$$

Write 2 as an improper fraction.

$$= \frac{4}{5} \times \frac{1}{2}$$

Multiply by the reciprocal of  $\frac{2}{1}$ , which is  $\frac{1}{2}$ .

$$= \frac{\overset{2}{\cancel{4}} \times 1}{5 \times \cancel{2}_1}$$

Multiply fractions. Divide out the common factor 2.

$$= \frac{2}{5}$$

Simplify.



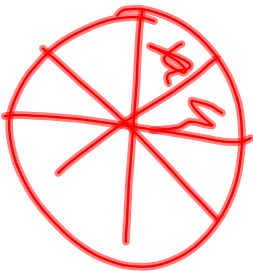
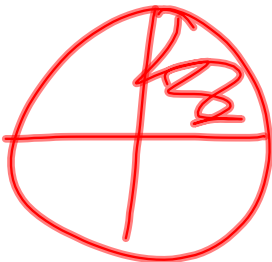


# TryIt!

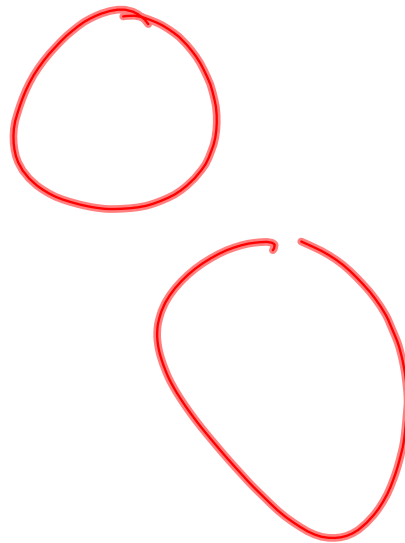
Try number 11 & 12 on page 66  
of your Big Ideas Text Book.

$$\begin{aligned} \frac{1}{3} &= \frac{10}{30} \\ \frac{1}{4} &= \frac{7.5}{30} \\ \frac{1}{5} &= \frac{6}{30} \end{aligned}$$

$\frac{1}{4}$  "  
 $\frac{2}{4}$  "



2  
1



$$\begin{array}{l} \ln 10 \\ \ln 4 \end{array} \div \frac{4}{1} = \frac{5}{32}$$

## 5 Using Order of Operations

Evaluate  $\frac{3}{8} + \frac{5}{6} \div 5$ .

$$\frac{3}{8} + \frac{5}{6} \div 5 = \frac{3}{8} + \frac{5}{6} \times \frac{1}{5}$$

Multiply by the reciprocal of 5, which is  $\frac{1}{5}$ .

$$= \frac{3}{8} + \frac{\cancel{5} \times 1}{6 \times \cancel{5}_1}$$

Multiply  $\frac{5}{6}$  and  $\frac{1}{5}$ . Divide out the common factor 5.

$$\frac{9}{24} + \frac{1}{24}$$

$$= \frac{3}{8} + \frac{1}{6}$$

Simplify.

$$= \frac{18}{48} + \frac{8}{48}$$

Rewrite fractions using a common denominator.

$$= \frac{26}{48}, \text{ or } \frac{13}{24}$$

Simplify.

# TryIt!

Try number 15 & 16 on page 66  
of your Big Ideas Text Book.

$$\begin{array}{cccc}
 \frac{2}{3} & \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \\
 \frac{1}{3} & \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \\
 \frac{1}{3} & \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \\
 \frac{1}{3} & \frac{1}{3} & \frac{1}{3} & \frac{1}{3}
 \end{array}
 = \frac{1}{3} \left( \frac{1}{3} \right)$$



$$\frac{8}{9} - \frac{2}{9} = \frac{6}{9} = \frac{2}{3}$$

$$\frac{5}{6} - \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$$

$$\frac{4}{6} = \frac{2}{3}$$

$$\frac{5}{6} - \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$$

## $\frac{2}{5} \cdot \frac{60^{12}}{1}$ On Your Own

**VIDEO CHATTING** You use  $\frac{1}{8}$  of your battery for every  $\frac{2}{5}$  of an hour that you video chat. You use  $\frac{3}{4}$  of your battery video chatting. How long did you video chat?

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

**NUMBER SENSE** When is the reciprocal of a fraction a whole number? Explain.

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# Homework

Big Ideas Record and  
Pracce Journal

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