October 12, 2015 TPA Lesson 2.2

Learning Objective: Students will be able to use a visual model and a formal rule to divide by a fraction.

Warm Up

705×156	183×515	625×208	276×150
957×393	547×404	719×628	919×800

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Warm Up Answers

705	183	625	276
× 156	× 515	× 208	× 150
4,230	915	5,000	0
35,250	1,830	0	13,800
70,500	91,500	125,000	27,600
109,980	94,245	130,000	41,400

957	547	719	919
× 393	× 404	× 628	× 800
2,871	2,188	5,752	0
86,130	0	14,380	0
287,100	218,800	431,400	735,200
376,101	220,988	451,532	735,200

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Essential Question:

How can you divide by a fraction?

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Lesson Objective:

Students will be able to:

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

Self-Evaluation Scale

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, but still need help to use a visual model and a formal rule to divide by a fraction.
1	I do not know how to use a visual model and a formal rule to divide by a fraction.

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Homework Answers

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?

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

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Activity 1 & 2

With a partner, work on Activity 1 & 2 on pages 35 & 36 of your Big Ideas Record and Practice Journal.

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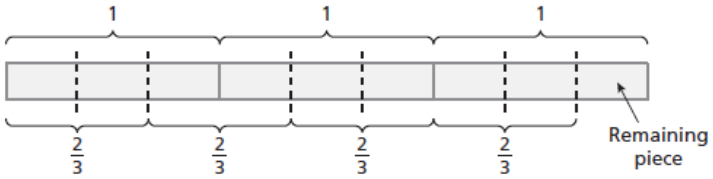
1 ACTIVITY: Dividing by a Fraction

Work with a partner. Write the division problem and solve it using a model.

a. How many two-thirds are in three?

The division problem is _____.



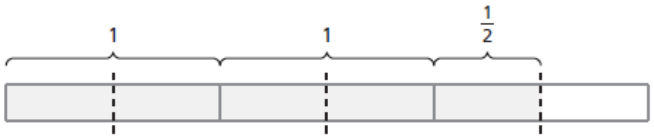
How many groups of $\frac{2}{3}$ are in 3? _____

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

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

So, _____ ÷ _____ = _____.

b. How many halves are in five halves?



c. How many four-fifths are in eight?

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Work with a partner.

a. Complete each table.

Division Table

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

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
8×1	8
8×2	
8×4	
8×8	

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Two numbers whose product is 1 are **reciprocals**. To write the reciprocal of a number, write the number as a fraction. Then invert the fraction. So, the reciprocal of a fraction $\frac{a}{b}$ is $\frac{b}{a}$, where a and $b \neq 0$.

The Meaning of a Word • Invert

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

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1 Writing Reciprocals

	Original Number	*Fraction*	*Reciprocal*	*Check*
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	$\frac{2}{1}$	$\frac{1}{2}$	$\frac{2}{1} \times \frac{1}{2} = 1$

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On Your Own

Write the reciprocal of the number.

1. $\frac{3}{4}$ **2.** 5 **3.** $\frac{7}{2}$ **4.** $\frac{4}{9}$

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Key Idea

Dividing Fractions

Words To divide a number by a fraction, multiply the number by the reciprocal of the fraction.

Numbers $\frac{1}{5} \div \frac{3}{4} = \frac{1}{5} \times \frac{4}{3} = \frac{1 \times 4}{5 \times 3}$

Algebra $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{a \cdot d}{b \cdot c}$, where b, c, and $d \neq 0$

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2 Dividing a Fraction by a Fraction

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

$\frac{1}{6} \div \frac{2}{3} = \frac{1}{6} \times \frac{3}{2}$ Multiply by the reciprocal of $\frac{2}{3}$, which is $\frac{3}{2}$.

$= \frac{1 \times \cancel{3}^{1}}{\cancel{6}_{2} \times 2}$ Multiply fractions. Divide out the common factor 3.

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

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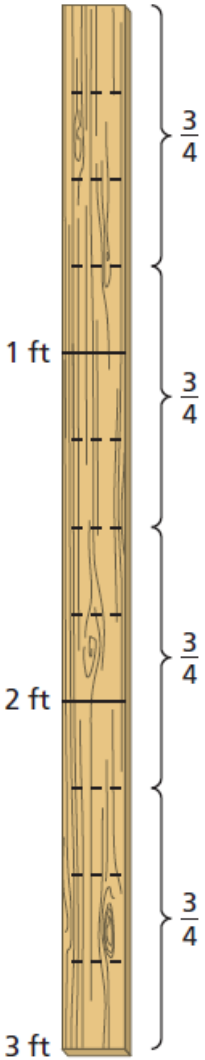
EXAMPLE 3 Dividing a Whole Number by a Fraction



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.

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

$= \frac{\overset{1}{\cancel{3}} \times 4}{\underset{1}{\cancel{3}}}$ Multiply. Divide out the common factor 3.

$= 4$ Simplify.

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

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On Your Own

Divide. Write the answer in simplest form.

5. $\frac{2}{7} \div \frac{1}{3}$ **6.** $\frac{1}{2} \div \frac{1}{8}$ **7.** $\frac{3}{8} \div \frac{1}{4}$ **8.** $\frac{2}{5} \div \frac{3}{10}$

9. How many $\frac{1}{2}$-foot pieces can you cut from a 7-foot piece of wood?

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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 $\frac{1}{2}$.

$$= \frac{\overset{2}{\cancel{4}} \times 1}{5 \times \underset{1}{\cancel{2}}}$$ Multiply fractions. Divide out the common factor 2.

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

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Assignment

Complete problems 8, 9, 11, 13, 19, 21, 43, 48, & 51 on pages 67 & 68 in your Big Ideas Text Book.

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Homework

In your Big Ideas Record and Practice Journal page 38.