

Learning Objective: Students will be able to use a model and a formal rule to divide with mixed numbers.

Warm Up

1. $\frac{5}{6} \times \frac{1}{2}$

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

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

2. $\frac{4}{9} \times \frac{2}{3}$

6. $\frac{5}{11} \times \frac{1}{3}$

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

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Warm Up Answers

$$1. \frac{5}{6} \times \frac{1}{2} \\ = \frac{5}{12}$$

$$5. \frac{7}{9} \times \frac{1}{2} \\ = \frac{7}{18}$$

$$9. \frac{1}{2} \times \frac{1}{3} \\ = \frac{1}{6}$$

$$2. \frac{4}{9} \times \frac{2}{3} \\ = \frac{8}{27}$$

$$6. \frac{5}{11} \times \frac{1}{3} \\ = \frac{5}{33}$$

$$10. \frac{1}{8} \times \frac{1}{4} \\ = \frac{1}{32}$$

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Homework Answers

2.2 Record and Practice Journal

Complete the statement.

1. $\frac{3}{8} \times \frac{8}{3} = 1$

2. $7 \times \frac{1}{7} = 1$

3. $3 + \frac{1}{12} = 36$

4. $\frac{4}{9} + \frac{1}{27} = 12$

Evaluate the expression.

5. $\frac{1}{3} + \frac{1}{6}$

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

7. $6 \div \frac{2}{5}$

2

$\frac{3}{5}$

15

8. $\frac{4}{9} + \frac{2}{3} + \frac{5}{6}$

9. $\frac{1}{3} + \frac{4}{7} + \frac{3}{10}$

10. $\frac{7}{8} \cdot \frac{4}{5} + \frac{7}{20}$

$\frac{4}{5}$

$2\frac{5}{21}$

2

11. In a jewelry store, rings make up $\frac{5}{9}$ of the inventory. Earrings make up $\frac{4}{15}$ of the inventory. How many times greater is the ring inventory than the earring inventory?

$2\frac{1}{12}$

~~2/12~~
5/12
~~2/12~~
-1-
5/12

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Lesson 2.3

October 27, 2015

Essential Question:

How can you model division by a mixed number?

Lesson Objective:

Students will be able to:

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Self-Evaluation Scale

Score	Description
4	I can teach other students how to use a model and a formal rule to divide with mixed numbers.
3	I can use a model and a formal rule to divide with mixed numbers.
2	I recognize, but still need help to use a model and a formal rule to divide with mixed numbers.
1	I do not know how to use a model and a formal rule to divide with mixed numbers.

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Activity 1 & 2

With a partner, work on Activity 1 & 2 on pages 39 & 40 of your Big Ideas Record and Practice Journal.

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2 ACTIVITY: Dividing Mixed Numbers

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

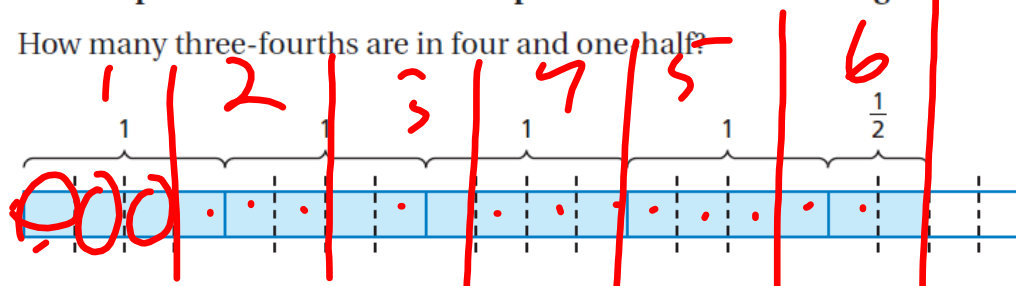
~~Handwritten notes on the left side of the page:~~

$4\frac{1}{2}$: : : : :
~~1 2 3 4 5 6~~

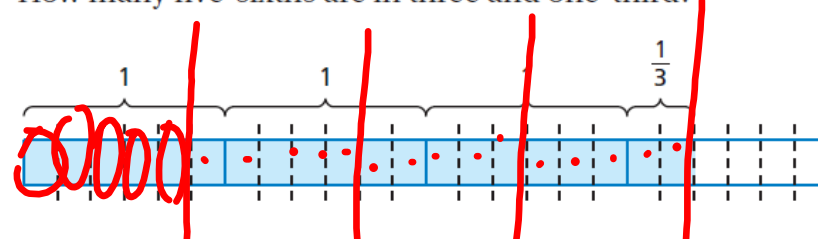
$3\frac{1}{3}$: : : : :
~~1 2 3 4 5 6~~

$3\frac{3}{4}$: : : : :
~~1 2 3 4 5 6~~

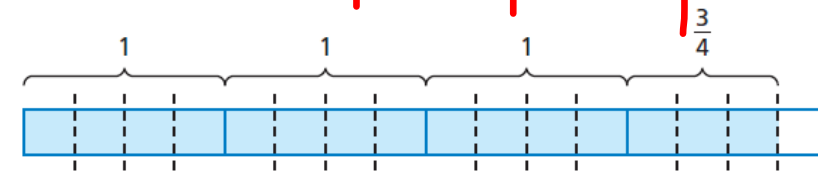
a. How many three-fourths are in four and one-half?



b. How many five-sixths are in three and one-third?



c. How many three-eighths are in three and three-fourths?



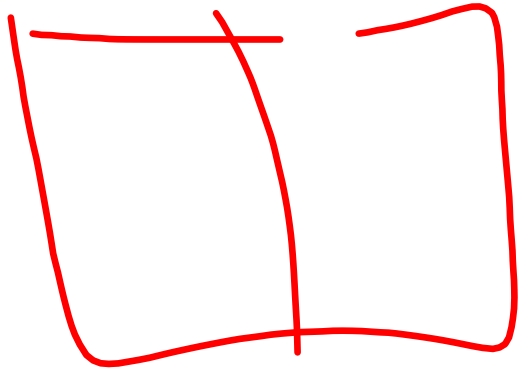
d. How many one and one-halves are in six?

e. How many one and one-fifths are in five?

f. How many one and one-fourths are in four and one-half?

g. How many two and one-thirds are in five and five-sixths?

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



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Key Idea

Dividing Mixed Numbers

Write each mixed number as an improper fraction. Then divide as you would with proper fractions.

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1 Dividing a Mixed Number by a Fraction

Find $2\frac{1}{4} \div \frac{3}{8}$.

$$2\frac{1}{4} \div \frac{3}{8} = \frac{9}{4} \div \frac{3}{8}$$

$$= \frac{9}{4} \times \frac{8}{3}$$

$$= \frac{\overset{3}{\cancel{9}} \times \overset{2}{\cancel{8}}}{\underset{1}{\cancel{4}} \times \underset{1}{\cancel{3}}}$$

$$= 6$$

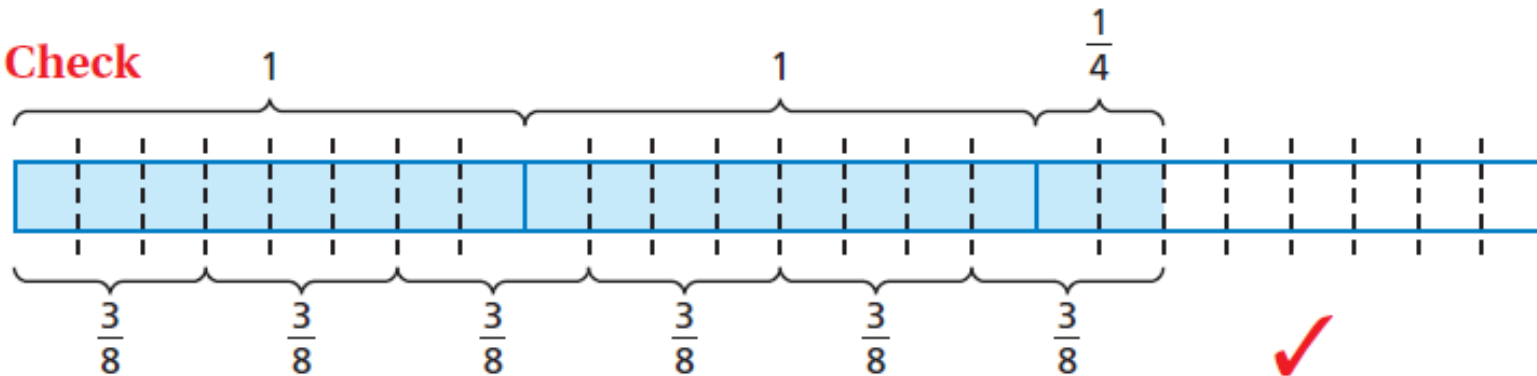
Write $2\frac{1}{4}$ as the improper fraction $\frac{9}{4}$.

Multiply by the reciprocal of $\frac{3}{8}$, which is $\frac{8}{3}$.

Multiply fractions. Divide out common factors.

Simplify.

Check



11

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

9

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

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2 Dividing Mixed Numbers

Find $3\frac{5}{6} \div 1\frac{2}{3}$.

$$3\frac{5}{6} \div 1\frac{2}{3} = \frac{23}{6} \div \frac{5}{3}$$

$$= \frac{23}{6} \times \frac{3}{5}$$

$$= \frac{23 \times \cancel{3}^1}{\cancel{2} \times 5}$$

$$= \frac{23}{10}, \text{ or } 2\frac{3}{10}$$

••• So, the quotient is $2\frac{3}{10}$.

Estimate $4 \div 2 = 2$

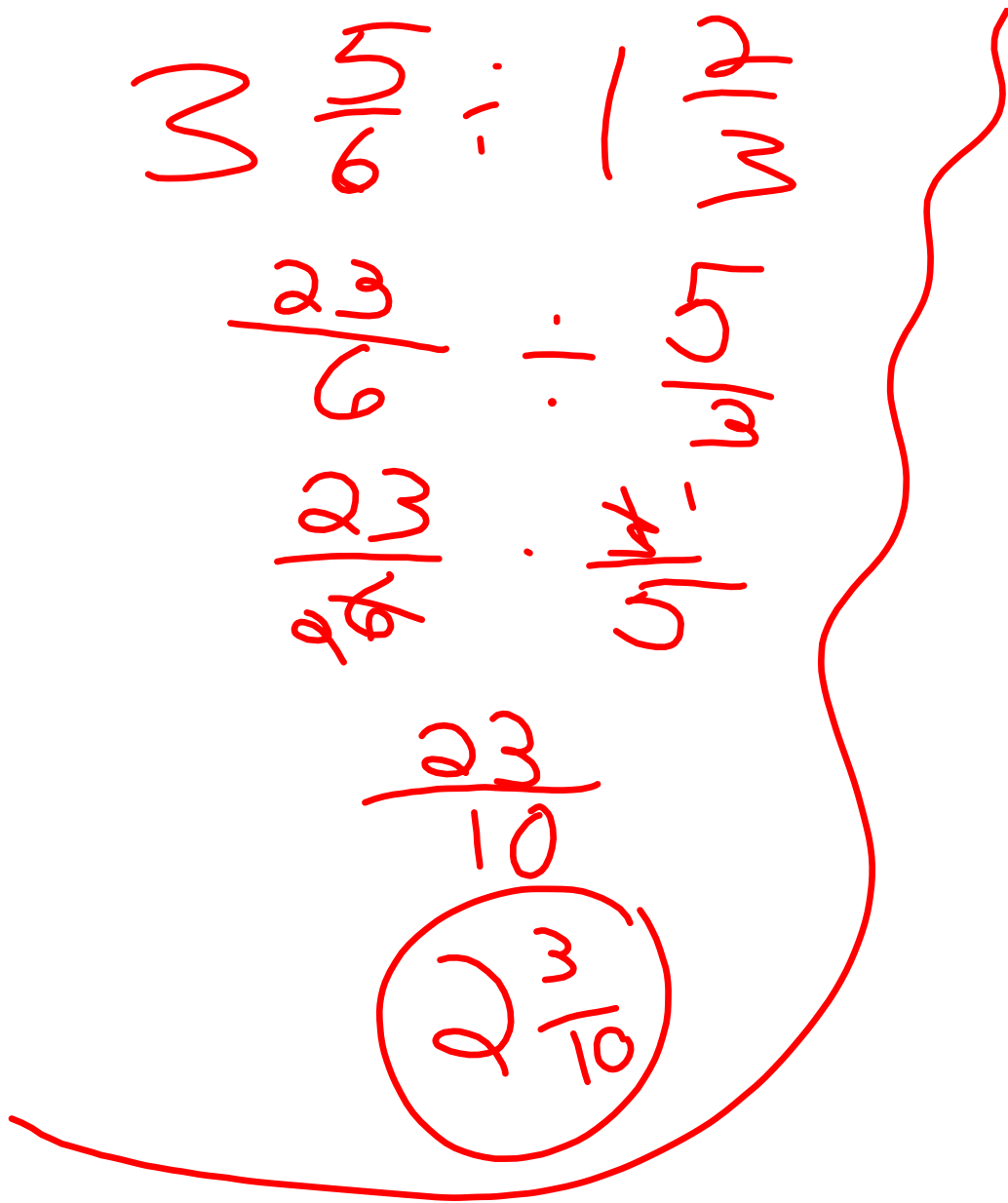
Write each mixed number as an improper fraction.

Multiply by the reciprocal of $\frac{5}{3}$, which is $\frac{3}{5}$.

Multiply fractions. Divide out common factors.

Simplify.

Reasonable? $2\frac{3}{10} \approx 2$ ✓



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3

Using Order of Operations

Evaluate $5\frac{1}{4} \div 1\frac{1}{8} - \frac{2}{3}$.

$$5\frac{1}{4} \div 1\frac{1}{8} - \frac{2}{3} = \frac{21}{4} \div \frac{9}{8} - \frac{2}{3}$$

$$= \frac{21}{4} \times \frac{8}{9} - \frac{2}{3}$$

$$= \frac{\overset{7}{\cancel{21}} \times \overset{2}{\cancel{8}}}{\underset{1}{\cancel{4}} \times \underset{3}{\cancel{9}}} - \frac{2}{3}$$

$$= \frac{14}{3} - \frac{2}{3}$$

$$= \frac{12}{3}, \text{ or } 4$$

Write each mixed number as an improper fraction.

Multiply by the reciprocal of $\frac{9}{8}$, which is $\frac{8}{9}$.

Multiply $\frac{21}{4}$ and $\frac{8}{9}$. Divide out common factors.

Simplify.

Subtract.

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4 Real-Life Application

One serving of tortilla soup is $1\frac{2}{3}$ cups. A restaurant cook makes 50 cups of soup. Is there enough to serve 35 people? Explain.

Divide 50 by $1\frac{2}{3}$ to find the number of available servings.



$$\begin{aligned}
 50 \div 1\frac{2}{3} &= \frac{50}{1} \div \frac{5}{3} \\
 &= \frac{50}{1} \cdot \frac{3}{5} \\
 &= \frac{10 \cancel{50} \cdot 3}{1 \cdot \cancel{5} 1} \\
 &= 30
 \end{aligned}$$

Rewrite each number as an improper fraction.

Multiply by the reciprocal of $\frac{5}{3}$, which is $\frac{3}{5}$.

Multiply fractions. Divide out common factors.

Simplify.

❖ No. Because 30 is less than 35, there is not enough soup to serve 35 people.

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On Your Own

Evaluate the expression. Write the answer in simplest form.

5. $1\frac{1}{2} \div \frac{1}{6} - \frac{7}{8}$

6. $3\frac{1}{3} \div \frac{5}{6} + \frac{8}{9}$

7. $\frac{2}{5} + 2\frac{4}{5} \div 1\frac{3}{4}$

8. $\frac{2}{3} - 1\frac{4}{7} \div 4\frac{5}{7}$

9. In Example 4, can 30 cups of tortilla soup serve 15 people? Explain.

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Assignment

Complete problems:

5, 10, 15, 20, 23, 24, 26, 30, 34, & 39

on pages 74 & 75 in your Big Ideas Text Book.

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Homework

In your Big Ideas Record and Practice Journal
page 42.