6th Grade Math

Module 2: Arithmetic Operations Including Division of Fractions

Math Parent Letter

This document is created to give parents and students a better understanding of the math concepts found in Eureka Math (© 2013 Common Core, Inc.) and is also posted as the Engage New York material being taught in the classroom. In Module 2 of Eureka Math (Engage New York), students will complete their understanding of the four operations (addition, subtraction, multiplication and division) through the study of division of whole numbers, division by fractions and operations on multi-digit decimals.

Focus Area Topic A:

Dividing Fractions by Fractions

Words to Know:

Prime Number - a natural number greater than 1 that has no positive divisors other than 1 and itself.

Composite Number - a natural number greater than 1 that is not a prime number is called a composite number.

Factor - a number or quantity that when multiplied with another produces a given number or expression.

Multiple - a number that can be divided by another number without a remainder.

Partitive Division – a division problem in which the group size is unknown

Measurement Division – a division problem in which the number of groups is unknown.

Dividend - a number to be divided by another number.

Divisor - a number by which another number is to be divided.

Quotient - a result obtained by dividing one quantity by another.

Reciprocal (Inverse) - the reciprocal of a number is one divided by that number.

## Focus Area Topic A:

Dividing Fractions by Fractions

Students will use visual models (fraction bars, number lines, and area models) to show the quotient of whole numbers and fractions. Students will then use the models to show the connection between those models and the multiplication of fractions.

Dividing Fractions by Whole Numbers

Example Problem and Solution:

Luke and Derek ate 5/8 of a pizza. How much pizza were they each able to take home if they split the rest of the pizza evenly?
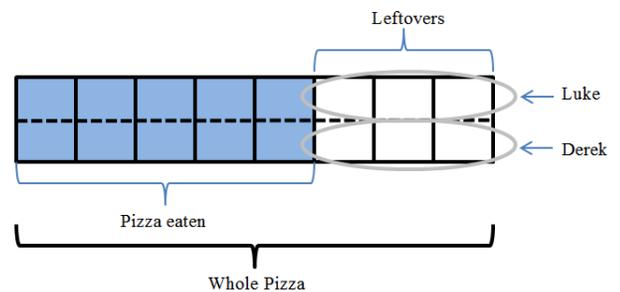

Luke and Derek will be able to take home 3 pieces each.

Since the boys ate 5/8 of the pizza, there were three pieces remaining. Three cannot be evenly divided into 2 people. We need to divide the entire pizza into 2 (for the 2 boys), creating 16 pieces instead of the original 8. Now, there are 6 pieces left, which can be divided into 2 people evenly. This leaves both boys with 3 pieces each.

Dividing Whole Numbers by Fractions

Example Problem and Solution:

How many ¼ pieces are in 3 candy bars?
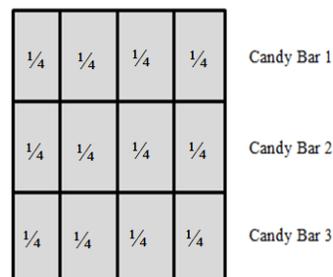
First, we must divide each candy bar into 4 equal pieces. It would be written as 3 ÷ ¼. There are four ¼ pieces in each candy bar. 4 pieces/candy bar x 3 candy bars = 12 pieces total.
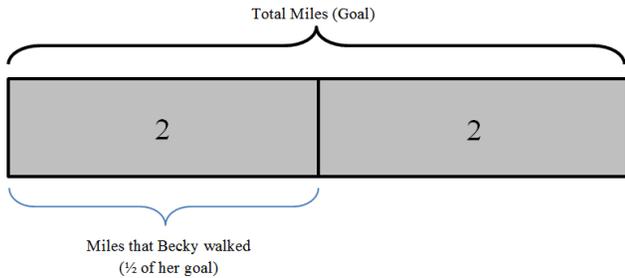
There are 12 pieces in all.

Example Problem and Solution:

Becky walked 2 miles on the treadmill one night. This was ½ of her goal. How many total miles will she have to walk to meet her goal?

Total Miles (Goal)

| 2 | 2 |

Miles that Becky walked
(½ of her goal)

In this example, we are not trying to find out how many halves are in 2. We know that 2 is part of the entire amount of miles walked. Instead, we need to determine one half of what number is 2. This would look like 2 ÷ ½.

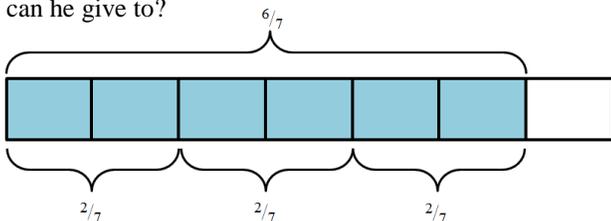*We can divide 2 by 1 to get the amount for each rectangle and then multiply by 2 because there are 2 rectangles total.*

2 ÷ 1 = 2   2 x 2 = 4

There are 4 miles total.

Dividing Fractions by Fractions with Like Demoninators

Example Problem and Solution:

Tucker had $^6/_7$ of his bag of candy left. He wanted to give $^2/_7$ of his candy to each of his friends. How many friends can he give to?

$^6/_7$

$^2/_7$ $^2/_7$ $^2/_7$

One way to think of this problem is how many two-sevenths are in six-sevenths? This means I need to divide $^6/_7$ by $^2/_7$, which is the same as 6 ÷ 2 = 3.

Tucker can give candy to 3 of his friends.

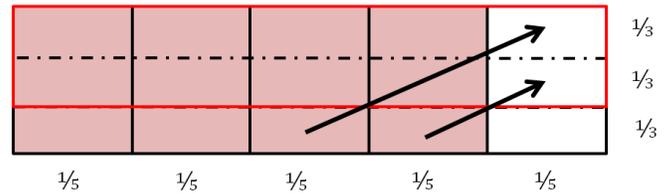## Dividing Fractions by Fractions with Unlike Demoninators

When modeling a division problem that involves dividing fractions by fractions with unlike denominators, you need to first find a common denominator between them.

Example Problem and Solution:
Divide $^4/_5$ by $^2/_3$.

In this example, the common denominator would be 15. $^4/_5$ of 15 is 12 so 12 boxes are shaded. Next, we want to see how many shaded boxes would make up ⅔. 5 out of 15 boxes = ⅓ so 10 out of 15 = ⅔. We have 12 boxes that are shaded. This means we have 1 whole ⅔ and 2 out of 10 boxes leftover to make another ⅔. 1 and $^2/_{10}$ is the same as $1^2/_{10}$, which reduces to $1^1/_5$.
There are $1^1/_5$ ⅔'s in $^4/_5$.

Another way to model this example is through a number line.
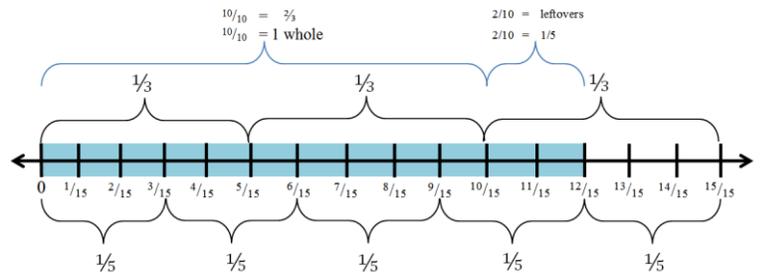
Dividing Fractions Using Multiplicative Inverses

Students will eventually work through examples of division of fractions using multiplicative inverses. Students need to grasp that dividing by a fraction gives the same result as multiplying by the inverse of that fraction. The terms **inverse** or **reciprocal** of a fraction, is the fraction made by interchanging the numerator and denominator.**Example Problem and Solution:**
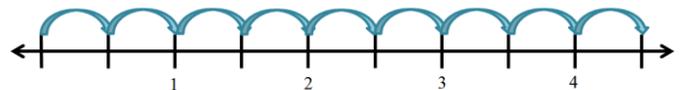
$$\frac{2}{3} \div \frac{1}{2} \qquad \text{Rewrite as } \frac{2}{3} \times \frac{2}{1} = \frac{4}{3} = 1\frac{1}{3}$$

Dividing Fractions and Mixed Numbers

To divide fractions and mixed numbers, convert the mixed number to an improper fraction (a fraction with a value greater than 1).

Example Problem and Solution:

$4\frac{1}{2} \div \frac{2}{3}$ To convert 4 ½ to an improper fraction, you need to see how many ½ are in 4 ½. There are 9 halves in 4 ½…this is written as $\frac{9}{2}$

$$\frac{9}{2} \times \frac{3}{2} = \frac{27}{4} = 6\frac{3}{4}$$