

Lesson 3-4

Dividing Rational Numbers



Interactive Study Guide

See pages 59–60 for:

- Getting Started
- Real-World Link
- Notes



Essential Question

What happens when you add, subtract, multiply, and divide rational numbers?



Common Core State Standards

Content Standards
7.NS.2, 7.NS.2a, 7.NS.2c,
7.NS.3, 7.EE.3

Mathematical Practices
1, 3, 4, 5, 7



Vocabulary

multiplicative inverse
reciprocal

What You'll Learn

- Divide positive and negative fractions using multiplicative inverses.
- Divide algebraic fractions.



Real-World Link

Global Literacy After learning the history of Mexico's holiday *El Día de los Muertos*, or *Day of the Dead*, students created clay containers to commemorate loved ones. They made their containers from two slabs of clay that they cut into thirds.



Divide Fractions

All of the properties of integers also apply to rational numbers. Two numbers whose product is 1 are called **multiplicative inverses** or **reciprocals**. The statement $\frac{1}{4} \cdot 4 = 1$ demonstrates this property too.

RECIPROCAL

$$\frac{4}{5} \cdot \frac{5}{4} = \frac{20}{20} = 1$$

Key Concept Inverse Property of Multiplication

Words The product of a number and its multiplicative inverse is 1.

Symbols For every number $\frac{a}{b}$, where $a, b \neq 0$, there is exactly one number $\frac{b}{a}$ such that $\frac{a}{b} \cdot \frac{b}{a} = 1$.

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

$$-\frac{2}{3} \cdot -\frac{3}{2} = +\frac{6}{6} = +1$$

Example 1

Tutor

Find the multiplicative inverse of each number.

a. $\frac{7}{16}$

$$\frac{7}{16} \left(\frac{16}{7} \right) = 1 \quad \text{The product is 1.}$$

The multiplicative inverse or reciprocal of $\frac{7}{16}$ is $\frac{16}{7}$.

b. $-6\frac{1}{3}$

$$-6\frac{1}{3} = -\frac{19}{3}$$

$$-\frac{19}{3} \left(-\frac{3}{19} \right) = 1$$

The multiplicative inverse or reciprocal of $-6\frac{1}{3}$ is $-\frac{3}{19}$.

Write $-6\frac{1}{3}$ as an improper fraction.
The product is 1.

Got It? Do these problems to find out.

1a. $-\frac{7}{9}$

1b. $2\frac{1}{12}$