

Dividing Rational Numbers (Pages 154–159)

You can use the same rules of signs when dividing rational numbers that you used for multiplying. Two numbers whose product is 1 are called **multiplicative inverses** or **reciprocals**.

Dividing Two Rational Numbers	The quotient of two numbers having the <i>same sign</i> is positive. The quotient of two numbers having <i>different signs</i> is negative.
Multiplicative Inverse Property	The product of a number and its multiplicative inverse is 1. For example, $\frac{4}{5}$ and $\frac{5}{4}$ are multiplicative inverses.
Dividing Fractions	To divide a fraction by any nonzero number, multiply by its reciprocal.

EXAMPLES

A Find $\frac{4}{5} \div (-6)$.

$$\begin{aligned} \frac{4}{5} \div (-6) &= \frac{4}{5} \cdot \left(-\frac{1}{6}\right) && \text{Multiply by } -\frac{1}{6}, \text{ the} \\ & && \text{reciprocal of } -6. \\ &= -\frac{4}{30} \text{ or } -\frac{2}{15} && \text{The signs are different,} \\ & && \text{so the product is} \\ & && \text{negative.} \end{aligned}$$

B Evaluate $\frac{x}{3}$ if $x = \frac{3}{4}$.

$$\begin{aligned} \frac{x}{3} &= \frac{\frac{3}{4}}{3} && \text{Replace } x \text{ with } \frac{3}{4}. \\ &= \frac{3}{4} \div 3 && \text{Rewrite.} \\ &= \frac{3}{4} \cdot \frac{1}{3} && \text{Multiply by } \frac{1}{3}, \text{ the reciprocal of } 3. \\ &= \frac{3}{12} \text{ or } \frac{1}{4} \end{aligned}$$

PRACTICE

Find each quotient.

- $-8.1 \div (-3)$
- $4.9 \div (-7)$
- $4.8 \div 16$
- $-10.5 \div 1.5$
- $-4\frac{2}{7} \div (-10)$
- $8 \div \left(-\frac{4}{9}\right)$
- $-\frac{5}{6} \div \frac{5}{2}$
- $-16 \div \frac{8}{9}$
- $\frac{3}{8} \div \frac{1}{2}$
- $-2 \div \frac{1}{10}$
- $-1\frac{2}{3} \div \left(-\frac{5}{7}\right)$
- $\frac{3}{4} \div \frac{2}{5}$

Evaluate each expression if $x = \frac{1}{4}$, $y = -\frac{1}{5}$, and $z = \frac{2}{3}$.

- $\frac{y}{z}$
- $\frac{-x}{2}$
- $\frac{z}{x}$



16. Standardized Test Practice How many boxes of peanuts can you get from 52 pounds of peanuts if each box holds $1\frac{5}{8}$ pounds of peanuts?

- A** 84 **B** 32 **C** 26 **D** 50

Answers: 1. 2.7 2. -0.7 3. 0.3 4. -7 5. $\frac{7}{3}$ 6. -18 7. - $\frac{3}{1}$ 8. -18 9. $\frac{4}{3}$ 10. -20 11. 2 $\frac{3}{1}$ 12. 1 $\frac{8}{7}$ 13. - $\frac{10}{3}$ 14. - $\frac{8}{1}$ 15. 2 $\frac{3}{2}$ 16. B