

Dividing Rational Numbers

Two numbers whose product is 1 are called reciprocals or multiplicative inverses. Examples are 4 and $\frac{1}{4}$; $-\frac{3}{2}$ and $-\frac{2}{3}$.

Division Rule

"Thou shalt not divide fractions." One must multiply by the reciprocal.

Find the multiplicative inverse (reciprocal) of each.

1) -6

$$-\frac{1}{6}$$

2) $\frac{5}{7}$

$$\frac{7}{5}$$

3) $-3\frac{2}{5}$

~~$-\frac{17}{5}$~~

$\rightarrow -\frac{5}{17}$

Find each quotient. Write in simplest form.

$$4) \frac{4}{5} \div \frac{3}{10}$$

$$\frac{\cancel{4}}{\cancel{5}} \cdot \frac{\cancel{10}^2}{3}$$

$$\frac{8}{3}$$

$$5) \frac{5}{6} \div 3$$

$$\frac{5}{6} \cdot \frac{1}{3}$$

$$\frac{5}{18}$$

Find each quotient. Write in simplest form.

$$6) \quad 9\frac{1}{3} \div -3\frac{1}{9}$$

$$\frac{28}{3} \div -\frac{28}{9}$$

$$\frac{\cancel{28}}{\cancel{3}} \cdot -\frac{\cancel{9}^3}{\cancel{28}_1} = -\frac{3}{1} \text{ or } -3$$

Find each quotient. Write in simplest form.

$$\begin{array}{l} 7) \frac{5x}{8y} \div \frac{10}{16y} \\ \frac{\cancel{5}x}{\cancel{8}y} \cdot \frac{\cancel{16}^2y}{\cancel{10}_2} = \frac{\cancel{2}x}{\cancel{2}} = x \text{ or } 1x \end{array}$$

Find each quotient. Write in simplest form.

$$8) \frac{5ab}{6} \div \frac{10b}{7} \qquad \frac{11c}{5}$$

$$\frac{\cancel{5}ab}{6} \cdot \frac{7}{\cancel{10}b_2} = \frac{7a}{12}$$

A box of cereal contains $15 \frac{3}{5}$ ounces. If one bowl holds $2 \frac{2}{5}$ ounces, how many bowls of cereal are in one box?

$$15 \frac{3}{5} \div 2 \frac{2}{5}$$
$$\overset{13}{\cancel{39}} \cdot \frac{\cancel{78}}{\cancel{5}} \cdot \frac{\cancel{5}}{\cancel{12}} = \frac{13}{2} = 6 \frac{1}{2} \text{ bowls}$$