

$-7 + 7 = 0$   
additive inverses = opposites

Accelerated Math Notes  
(Section 3.4)  
Division of Rational Numbers

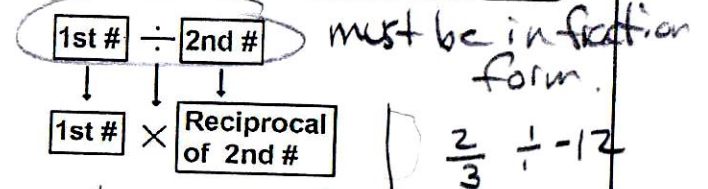
Two numbers whose product is one are called **multiplicative inverse** or **reciprocals**.

Examples:

$\frac{2}{3}$  and  $\frac{3}{2}$        $\frac{4}{3} \cdot \frac{3}{4} = 1$   
 $-\frac{3}{4}$  and  $-\frac{4}{3}$        $-\frac{1}{4} \cdot -\frac{4}{1} = 1$   
 $2\frac{1}{3} = \frac{7}{3}$  and  $\frac{3}{7}$

Subtraction = Adding the opposite

Dividing by a fraction = Multiplying by its reciprocal



Examples:

$-\frac{2}{5} \div \frac{4}{15}$        $-\frac{2}{5} \div -12$   
 $-\frac{14}{3} \div \frac{28}{9}$        $\frac{2}{3} \div -\frac{1}{7}$   
 $-\frac{1}{5} \cdot \frac{15}{4}$        $-\frac{1}{5} \cdot \frac{1}{12}$   
 $-\frac{3}{2}$  or  $-\frac{1}{2}$        $-\frac{1}{60}$   
 $-\frac{3}{2}$  or  $-1\frac{1}{2}$        $-\frac{1}{18}$

More Examples:

$\frac{5}{3ab} \div \frac{15}{abc}$        $\frac{6a}{5bc} \div \frac{15b}{2ac}$   
 $\frac{1}{3ab} \cdot \frac{abc}{15}$        $\frac{2}{5bc} \cdot \frac{2ac}{15b}$   
 $\frac{c}{9}$        $\frac{4a^2}{25b^2}$

Word Problems:

1) A car gets  $40\frac{1}{2}$  mpg. How many gallons are needed to travel 324 miles?

$324 \div 40\frac{1}{2} = \frac{324}{1} \div \frac{81}{2} = \frac{324}{1} \cdot \frac{2}{81} = 8$

8 gal

2) How many  $2\frac{1}{2}$  inch lengths can be cut from 1 yard of ribbon?

$1 \text{ yd} = 36 \text{ in}$   
 $36 \div 2\frac{1}{2} = \frac{36}{1} \div \frac{5}{2} = \frac{36}{1} \cdot \frac{2}{5} = \frac{72}{5}$  or  $14\frac{2}{5}$  lengths

3) Jon has a board that is  $8\frac{1}{4}$  feet long. He wants to cut it into 6 equal lengths. How long will each piece be?

$8\frac{1}{4} \div 6 = \frac{33}{4} \div 6 = \frac{33}{4} \cdot \frac{1}{6} = \frac{11}{8}$  or  $1\frac{3}{8}$  feet