

## Lesson 2-2

### Example 1 Use a Number Line to Add Rational Numbers

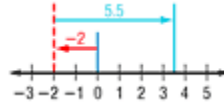
Use a number line to find each sum.

a.  $-2 + 5.5$

**Step 1** Draw an arrow from 0 to  $-2$ .

**Step 2** Then draw a second arrow 5.5 units to the right to represent adding 5.5.

**Step 3** The second arrow ends at the sum 3.5. So,  $-2 + 5.5 = 3.5$ .



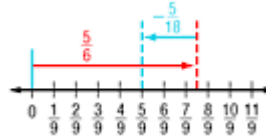
b.  $\frac{5}{6} + \left(\frac{-5}{18}\right)$

**Step 1** Draw an arrow from 0 to  $\frac{5}{6}$ .

**Step 2** Then draw a second arrow  $\frac{5}{18}$  units to the left.

**Step 3** The second arrow ends at the sum

$\frac{5}{9}$ . So,  $\frac{5}{6} + \left(\frac{-5}{18}\right) = \frac{5}{9}$ .



### Example 2 Add Rational Numbers

Find each sum.

a.  $4.6 + (-5.2)$

$$\begin{aligned} 4.6 + (-5.2) &= +(|4.6| - (|-5.2|)) && \text{Subtract the absolute values. Since the} \\ &= +(4.6 - 5.2) && \text{number with the greater absolute value} \\ &= -0.6 && \text{is 5.2, the sum is negative.} \end{aligned}$$

b.  $-\frac{4}{7} + \left(\frac{-2}{3}\right)$

$$-\frac{4}{7} + \left(\frac{-2}{3}\right) = -\frac{12}{21} + \left(-\frac{14}{21}\right) \quad \text{The LCD is 21. Replace } -\frac{4}{7} \text{ with } -\frac{12}{21} \text{ and } -\frac{2}{3} \text{ with } -\frac{14}{21}.$$

$$= -\left(\left|-\frac{12}{21}\right| + \left|-\frac{14}{21}\right|\right) \quad \text{Both the numbers are negative, so the sum is negative.}$$

$$= -\left(\frac{12}{21} + \frac{14}{21}\right) \quad \text{Simplify.}$$

$$= -\frac{26}{21} \quad \text{Add.}$$

$$= -1\frac{5}{21}$$

**Example 3 Subtract Rational Numbers to Solve a Problem**

**POPULATION** The population in Baltimore Maryland in 1980 was 786,741. In 2000, the population of Baltimore was 651,154. Find the change in the population of Maryland between 1980 and 2000. Source: *The World Almanac*

**Explore** The population started at 786,741 in 1980 and ended at 651,154 in 2000. You need to determine the change in population for the 20 years.

**Plan** Subtract to find the change in population.  
ending population                      minus                      beginning population

$$651,154 \qquad - \qquad 786,741$$

**Solve**  $651,154 - 786,741 = 651,154 + (-786,741)$                       To subtract 786,741, add its inverse.  
 $= -(|-786,741| - |651,154|)$                       Subtract the absolute values.  
 $= -(786,741 - 651,154)$                       The absolute value of  $-786,741$  is  
 $= -135,587$                       greater, so the result is negative.

The population change for the 20 years was  $-135,587$ .

**Examine** The problem asks for the change in population from 1980 to 2000. Since the change was negative, the population dropped. This makes sense since the ending population is less than the beginning population.