

# Operations with Rational Numbers

To add, subtract, multiply, or divide rational numbers, use the same rules for signs as you used for integers.

**Example 1** Find (a)  $-\frac{5}{6} + \frac{2}{3}$  and (b)  $7.3 - (-4.8)$ .

a. Write the fractions with the same denominator, then add.

$$-\frac{5}{6} + \frac{2}{3} = -\frac{5}{6} + \frac{4}{6} = \frac{-5 + 4}{6} = \frac{-1}{6} = -\frac{1}{6}$$

b. To subtract a rational number, add its opposite.

$$7.3 - (-4.8) = 7.3 + 4.8 = 12.1 \quad \text{The opposite of } -4.8 \text{ is } 4.8.$$

**Example 2** Find (a)  $2.25 \cdot 8$ , (b)  $-2.25 \cdot (-8)$ , and (c)  $-2.25 \cdot 8$ .

a.  $2.25 \cdot 8 = 18$

b.  $-2.25 \cdot (-8) = 18$

c.  $-2.25 \cdot 8 = -18$

**Example 3** Find  $-\frac{4}{9} \div \frac{3}{4}$ .

To divide by a fraction, multiply by its reciprocal.

$$-\frac{4}{9} \div \frac{3}{4} = -\frac{4}{9} \cdot \frac{4}{3} = \frac{-4 \cdot 4}{9 \cdot 3} = -\frac{16}{27} \quad \text{The reciprocal of } \frac{3}{4} \text{ is } \frac{4}{3}.$$

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Add, subtract, multiply, or divide.

1.  $-7.5 + 3.8$  **-3.7**      2.  $-18.3 + (-6.7)$  **-25**      3.  $0.6 - 0.85$  **-0.25**      4.  $6.13 - (-2.82)$  **8.95**

5.  $-6 \cdot 4.75$  **-28.5**      6.  $-3.2 \cdot (-4.8)$  **15.36**      7.  $-1.8 \div (-9)$  **0.2**      8.  $3.6 \div (-1.5)$  **-2.4**

9.  $-\frac{1}{6} + \frac{5}{6}$   **$\frac{2}{3}$**       10.  $-\frac{7}{10} + \left(-\frac{3}{5}\right)$   **$-1\frac{3}{10}$**       11.  $\frac{4}{9} - \frac{2}{3}$   **$-\frac{2}{9}$**       12.  $-\frac{5}{6} - \frac{1}{4}$   **$-1\frac{1}{12}$**

13.  $-\frac{3}{2} \cdot \left(-\frac{1}{8}\right)$   **$\frac{3}{16}$**       14.  $-\frac{3}{4} \cdot \frac{7}{12}$   **$-\frac{7}{16}$**       15.  $\frac{5}{8} \div \left(-\frac{1}{4}\right)$   **$-2\frac{1}{2}$**       16.  $-\frac{4}{7} \div \frac{2}{5}$   **$-1\frac{3}{7}$**

17. **TEMPERATURE** The temperature at midnight is shown. The outside temperature decreases  $2.3^\circ\text{C}$  over the next two hours. What is the outside temperature at 2 A.M.?  **$-33.2^\circ\text{C}$**

18. **SNOWFALL** In January, a city's snowfall was  $\frac{5}{8}$  foot below the historical average. In February, the snowfall was  $\frac{3}{4}$  foot above the historical average. Was the city's snowfall in the two-month period above or below the historical average? By how much?

above average;  $\frac{1}{8}$  foot

