

**SCALAR MULTIPLICATION** In **scalar multiplication**, every element in a matrix is multiplied by a real number called a **scalar**.

**EXAMPLE 2** Perform scalar multiplication

Perform the indicated operation.

$$\begin{aligned} \text{a. } 6 \begin{bmatrix} -7 & -\frac{1}{3} \\ \frac{1}{2} & 11 \end{bmatrix} &= \begin{bmatrix} 6(-7) & 6\left(-\frac{1}{3}\right) \\ 6\left(\frac{1}{2}\right) & 6(11) \end{bmatrix} \\ &= \begin{bmatrix} -42 & -2 \\ 3 & 66 \end{bmatrix} \end{aligned}$$

$$\begin{aligned} \text{b. } -2 \begin{bmatrix} 0.5 \\ -3.2 \\ 8.1 \end{bmatrix} &= \begin{bmatrix} -2(0.5) \\ -2(-3.2) \\ -2(8.1) \end{bmatrix} \\ &= \begin{bmatrix} -1 \\ 6.4 \\ -16.2 \end{bmatrix} \end{aligned}$$

**PRACTICE**

**EXAMPLES 1 and 2**

on pp. 94–95  
for Exs. 1–10

Perform the indicated operation, if possible.

1.  $\begin{bmatrix} 7 & 6 \\ 3 & 2 \end{bmatrix} + \begin{bmatrix} 9 & -2 \\ 5 & 10 \end{bmatrix}$

2.  $\begin{bmatrix} -8 \\ -4 \\ 1 \end{bmatrix} + \begin{bmatrix} 11 \\ -9 \\ -6 \end{bmatrix}$

3.  $\begin{bmatrix} -8 & -1 & -9 \\ -4 & -3 & 2 \end{bmatrix} - \begin{bmatrix} 7 & 3 & 0 \\ -2 & -5 & 7 \end{bmatrix}$

4.  $\begin{bmatrix} 11 & -12 \\ 15 & -22 \end{bmatrix} - \begin{bmatrix} 7 \\ 8 \end{bmatrix}$

5.  $[-9.1 \ 5.4 \ 3.7] + [1.3 \ -6.7]$

6.  $\begin{bmatrix} \frac{3}{4} & -2 \\ 6 & -3 \end{bmatrix} - \begin{bmatrix} 8 & -2 \\ 6 & -\frac{5}{6} \end{bmatrix}$

7.  $7 \begin{bmatrix} -4 & -7 \\ \frac{1}{2} & \frac{4}{9} \end{bmatrix}$

8.  $2 \begin{bmatrix} 1.5 & -6 \\ -4.5 & 0 \end{bmatrix}$

9.  $-6 \begin{bmatrix} 12 \\ -3.4 \\ -0.7 \end{bmatrix}$

10.  $-\frac{1}{2} \begin{bmatrix} 18 & -26 & \frac{7}{4} \\ -\frac{2}{3} & 20 & -2 \end{bmatrix}$

11. **NUTRITION** The matrix shows the amounts (in milligrams) of calcium and potassium in one ounce of different types of milk. Write a matrix for the amounts of calcium and potassium in 8 ounces of each type of milk.

	Calcium (mg)	Potassium (mg)
Lowfat milk	32.940	36.295
Reduced fat milk	33.855	42.700
Whole milk	30.805	40.565

**CHALLENGE** Perform the indicated operations.

12.  $9 \left( \begin{bmatrix} 1 & -12 & 8 \\ -7 & 10 & -4 \end{bmatrix} + \begin{bmatrix} 3 & -3 & -7 \\ -5 & -21 & -12 \end{bmatrix} \right)$     13.  $\begin{bmatrix} -6 & -8 \\ 8 & 14 \end{bmatrix} - 7 \begin{bmatrix} 5 & 13 \\ -10 & -11 \end{bmatrix}$