12.2 Extra Practice

In Exercises 1–4, determine whether the product *AB* is defined. If so, state the dimensions of *AB*.

1. $A: 3 \times 2, B: 2 \times 3$ **2.** $A: 3 \times 3, B: 2 \times 2$ **3.** $A = \begin{bmatrix} -12 & 8 & -8 & 13 \\ -18 & 3 & -7 & -10 \end{bmatrix}, B = \begin{bmatrix} -7 & -9 & -12 & 10 \end{bmatrix}$ **4.** $A = \begin{bmatrix} 4 & -15 & -2 & 6 \end{bmatrix}, B = \begin{bmatrix} 2 \\ -17 \\ -8 \\ -25 \end{bmatrix}$

In Exercises 5–8, find the product, if possible. If not possible, explain why.

5.
$$\begin{bmatrix} 19\\1 \end{bmatrix} \begin{bmatrix} 12 & -9 \end{bmatrix}$$

6. $\begin{bmatrix} 38 & -41 & 39\\-27 & 0 & 12 \end{bmatrix} \begin{bmatrix} -29 & -46 & 33\\23 & -10 & 43 \end{bmatrix}$
7. $\begin{bmatrix} 3 & -6 & -9\\-2 & 5 & 6\\-1 & 0 & -10 \end{bmatrix} \begin{bmatrix} 8 & -2 & -1\\1 & 4 & -9\\-3 & 7 & 2 \end{bmatrix}$
8. $\begin{bmatrix} 2 & 3 & -5 & 4\\3 & -5 & 5 & 9 \end{bmatrix} \begin{bmatrix} 3 & 10 & -5\\2 & -7 & 5\\-9 & 6 & 5\\-3 & -6 & 5 \end{bmatrix}$

In Exercises 9–14, use the given matrices to evaluate the expression.

$$A = \begin{bmatrix} -1 & -7 \\ -4 & 0 \end{bmatrix}, B = \begin{bmatrix} -2 & 6 \\ 9 & -8 \end{bmatrix}, C = \begin{bmatrix} -2 & 9 \\ 4 & -8 \end{bmatrix}$$

9. $A - BC$
10. $AB - C$
11. $(AB)C$
12. $A(BC)$
13. $5(AB)$
14. $\frac{1}{2}(BC)$

In Exercises 15 and 16, solve for *x* and *y*.

15.
$$\begin{bmatrix} x & 5 \\ 9 & 0 \end{bmatrix} \begin{bmatrix} -5 & -9 \\ 2 & -1 \end{bmatrix} = \begin{bmatrix} -30 & -77 \\ -45 & y \end{bmatrix}$$
16. $\begin{bmatrix} -7 & x & -4 \end{bmatrix} \begin{bmatrix} 2 & 7 \\ -8 & -5 \\ -8 & 8 \end{bmatrix} = \begin{bmatrix} y & -126 \end{bmatrix}$

17. A chef buys fruit for two restaurant locations. She buys 4 pounds of apples, 5 pounds of bananas, and 8 pounds of oranges for the first location and 10 pounds of apples, 11 pounds of bananas, and 7 pounds of oranges for the second location. Apples cost \$1.25 per pound, bananas cost \$0.95 per pound, and oranges cost \$2.05 per pound. Use matrix multiplication to find the total cost of the fruit for each restaurant location.