

Practice B

For use with pages 208–213

State the dimensions of each matrix and determine whether the product AB is defined. If it is, state the dimensions of AB .

$$1. A = \begin{bmatrix} 1 & -2 \\ 3 & 4 \\ 4 & 1 \end{bmatrix}, B = [4 \quad 9 \quad -3]$$

$$2. A = \begin{bmatrix} 1 & 4 & -2 \\ 3 & -1 & 0 \end{bmatrix}, B = \begin{bmatrix} 3 & 1 & -2 \\ 5 & 2 & 4 \\ -3 & -6 & 7 \end{bmatrix}$$

$$3. A = \begin{bmatrix} 5 \\ -2 \\ 3 \\ 1 \end{bmatrix}, B = [1 \quad 7]$$

$$4. A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \\ -1 & 6 \\ 0 & -3 \end{bmatrix}, B = \begin{bmatrix} 1 & 7 & 3 & -4 \\ 6 & -2 & 6 & 1 \\ 5 & 4 & 8 & 0 \end{bmatrix}$$

Find the product. If it is not defined, state the reason.

$$5. [-3 \quad 5] \begin{bmatrix} -2 \\ 1 \end{bmatrix}$$

$$6. \begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$$

$$7. \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix} [1 \quad -3]$$

$$8. \begin{bmatrix} 1 & -2 \\ 6 & 4 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$$

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

$$10. \begin{bmatrix} -1 & 3 \\ 2 & 2 \end{bmatrix} \begin{bmatrix} 1 & 3 & 4 \\ -2 & 0 & 5 \end{bmatrix}$$

$$11. [-3 \quad 4 \quad 1 \quad 2] \begin{bmatrix} 1 \\ 2 \\ -5 \\ 3 \end{bmatrix}$$

$$12. \begin{bmatrix} 1 & -2 \\ 3 & 0 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 2 & -1 & 4 & 2 \\ 1 & 0 & 5 & -3 \end{bmatrix}$$

$$13. \begin{bmatrix} 4 & -1 \\ 0 & 2 \\ 3 & 1 \\ 6 & -2 \end{bmatrix} \begin{bmatrix} 3 \\ 2 \end{bmatrix}$$

Simplify the expression.

$$14. 4 \begin{bmatrix} \frac{1}{2} & -1 \\ -\frac{3}{4} & \frac{3}{2} \end{bmatrix} \begin{bmatrix} -3 & -5 \\ 4 & 2 \end{bmatrix}$$

$$15. \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} 5 & 2 \\ 1 & -1 \end{bmatrix} + \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} -3 & 5 \\ 2 & -2 \end{bmatrix}$$

$$16. \begin{bmatrix} 2 & -4 & 0 \\ 0 & 3 & 6 \\ -1 & 5 & 1 \end{bmatrix} \left(\begin{bmatrix} 1 & 2 \\ -3 & 0 \\ 5 & 1 \end{bmatrix} + \begin{bmatrix} 3 & -1 \\ 0 & 2 \\ 4 & 5 \end{bmatrix} \right)$$

$$17. \left(\begin{bmatrix} 3 \\ -1 \\ 0 \end{bmatrix} + \begin{bmatrix} 2 \\ 5 \\ 1 \end{bmatrix} \right) [4 \quad 4]$$

18. **Senior Play** The senior class play was performed on three different evenings. The attendance for each evening is shown in the table below. Adult tickets sold for \$3.50. Student tickets sold for \$2.50. Use matrix multiplication to determine how much money was taken in each night.

<i>Performance</i>	<i>Adults</i>	<i>Students</i>
Opening night	420	300
Second night	400	450
Final night	510	475