

# Practice 4-5

## 2 × 2 Matrices, Determinants, and Inverses

Find the matrix  $E^{-1}$  for each.

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

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

3.  $E = \begin{bmatrix} 2 & -1 \\ 1 & 0 \end{bmatrix}$

4.  $E = \begin{bmatrix} 2 & 3 \\ 1 & 1 \end{bmatrix}$

5.  $E = \begin{bmatrix} 1 & 4 \\ 1 & 3 \end{bmatrix}$

6.  $E = \begin{bmatrix} 4 & 7 \\ 3 & 5 \end{bmatrix}$

Find the inverse of each matrix, if it exists. If it does not exist, write *no inverse* and explain why not.

7.  $\begin{bmatrix} 3 & 4 \\ -3 & 4 \end{bmatrix}$

8.  $\begin{bmatrix} 3 & 4 \\ 3 & 4 \end{bmatrix}$

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

10.  $\begin{bmatrix} 30 & -4 \\ -25 & 3 \end{bmatrix}$

Solve each matrix equation.

11.  $\begin{bmatrix} 1 & 2 \\ -1 & -2 \end{bmatrix} X = \begin{bmatrix} 2 \\ -2 \end{bmatrix}$

12.  $\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} X = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$

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

Evaluate the determinant of each matrix.

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

15.  $\begin{bmatrix} 3 & 9 \\ 3 & 2 \end{bmatrix}$

16.  $\begin{bmatrix} 1 & -4 \\ 2 & 6 \end{bmatrix}$

17.  $\begin{bmatrix} 4 & -3 \\ 1 & -8 \end{bmatrix}$

18.  $\begin{bmatrix} 5 & 4 \\ 4 & 5 \end{bmatrix}$

19.  $\begin{bmatrix} 1 & -12 \\ 3 & 0 \end{bmatrix}$

Determine whether the matrices are multiplicative inverses.

20.  $\begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}, \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$

21.  $\begin{bmatrix} 4 & 9 \\ 2 & 6 \end{bmatrix}, \begin{bmatrix} 1 & -\frac{3}{2} \\ -\frac{1}{3} & \frac{2}{3} \end{bmatrix}$

22.  $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, \begin{bmatrix} -2 & 1 \\ \frac{3}{2} & -\frac{1}{2} \end{bmatrix}$