

Inverse Matrices

For each matrix state if an inverse exists.

1)
$$\begin{bmatrix} -9 & -9 \\ -2 & -2 \end{bmatrix}$$

No

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

Yes

3)
$$\begin{bmatrix} 4 & -5 \\ -9 & 6 \end{bmatrix}$$

Yes

4)
$$\begin{bmatrix} 0 & 0 \\ -6 & 4 \end{bmatrix}$$

No

Find the inverse of each matrix.

5)
$$\begin{bmatrix} 11 & -5 \\ 2 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -5 \\ 2 & -11 \end{bmatrix}$$

6)
$$\begin{bmatrix} 0 & -2 \\ -1 & -9 \end{bmatrix}$$

$$\begin{bmatrix} \frac{9}{2} & -1 \\ -\frac{1}{2} & 0 \end{bmatrix}$$

7)
$$\begin{bmatrix} -1 & 7 \\ -1 & 7 \end{bmatrix}$$

No inverse exists

8)
$$\begin{bmatrix} 1 & -1 \\ -6 & -3 \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{3} & -\frac{1}{9} \\ -\frac{2}{3} & -\frac{1}{9} \end{bmatrix}$$

$$9) \begin{bmatrix} 3 & -2 \\ -4 & 6 \end{bmatrix}$$

$$\begin{bmatrix} \frac{3}{5} & \frac{1}{5} \\ \frac{2}{5} & \frac{3}{10} \end{bmatrix}$$

$$10) \begin{bmatrix} -6 & 11 \\ -4 & 7 \end{bmatrix}$$

$$\begin{bmatrix} \frac{7}{2} & -\frac{11}{2} \\ 2 & -3 \end{bmatrix}$$

$$11) \begin{bmatrix} -9 & -6 \\ -5 & -4 \end{bmatrix}$$

$$\begin{bmatrix} -\frac{2}{3} & 1 \\ \frac{5}{6} & -\frac{3}{2} \end{bmatrix}$$

$$12) \begin{bmatrix} 5 & -8 \\ 6 & -9 \end{bmatrix}$$

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

$$13) \begin{bmatrix} 2 & -10 \\ -11 & 8 \end{bmatrix}$$

$$\begin{bmatrix} -\frac{4}{47} & -\frac{5}{47} \\ -\frac{11}{94} & -\frac{1}{47} \end{bmatrix}$$

$$14) \begin{bmatrix} -2 & -2 \\ 6 & 8 \end{bmatrix}$$

$$\begin{bmatrix} -2 & -\frac{1}{2} \\ \frac{3}{2} & \frac{1}{2} \end{bmatrix}$$

$$15) \begin{bmatrix} -2 & 2 \\ -9 & 8 \end{bmatrix}$$

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

$$16) \begin{bmatrix} -3 & 3 \\ 8 & 7 \end{bmatrix}$$

$$\begin{bmatrix} -\frac{7}{45} & \frac{1}{15} \\ \frac{8}{45} & \frac{1}{15} \end{bmatrix}$$

Critical thinking questions:

17) Give an example of a 2×2 matrix with no inverse.

Many answers. Ex: $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$

18) Give an example of a matrix which is its own inverse (that is, where $A^{-1} = A$)

Many answers. Ex: $\begin{bmatrix} -10 & 9 \\ -11 & 10 \end{bmatrix}$