Inverse Matrices … Set 1

Inverse Matrices

For each matrix state if an inverse exists.

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

2) $\begin{bmatrix} -2 & -2 \\ -3 & 10 \end{bmatrix}$

3) $\begin{bmatrix} 2 & 8 \\ 1 & -4 \end{bmatrix}$

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

Find, by hand, the inverse of each matrix.

5) $\begin{bmatrix} 9 & 9 \\ 0 & -8 \end{bmatrix}$

6) $\begin{bmatrix} 6 & 9 \\ 1 & 3 \end{bmatrix}$

7) $\begin{bmatrix} -7 & 9 \\ 0 & -8 \end{bmatrix}$

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

9) $\begin{bmatrix} -2 & 3 \\ 0 & -10 \end{bmatrix}$

10) $\begin{bmatrix} 6 & 3 \\ 8 & 4 \end{bmatrix}$

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Answers

Inverse Matrices

1) Yes

2) Yes

3) Yes

4) No

5) $-\frac{1}{72}\cdot\begin{bmatrix}-8 & -9\\ 0 & 9\end{bmatrix}$

6) $\frac{1}{9}\cdot\begin{bmatrix}3 & -9\\ -1 & 6\end{bmatrix}$

7) $\frac{1}{56}\cdot\begin{bmatrix}-8 & -9\\ 0 & -7\end{bmatrix}$

8) $-\frac{1}{16}\cdot\begin{bmatrix}-3 & 5\\ 5 & -3\end{bmatrix}$

9) $\frac{1}{20}\cdot\begin{bmatrix}-10 & -3\\ 0 & -2\end{bmatrix}$

10) No inverse exists

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Find, using technology, the inverse of each matrix.

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

12) $\begin{bmatrix} 7 & 3 \\ 0 & -6 \end{bmatrix}$

13) $\begin{bmatrix} -4 & 2 & -4 \\ -5 & 0 & 4 \\ -6 & 2 & -6 \end{bmatrix}$

14) $\begin{bmatrix} 1 & 5 & -5 \\ 0 & -3 & 1 \\ 0 & -3 & 1 \end{bmatrix}$

15) $\begin{bmatrix} -2 & 0 & 2 \\ -2 & -2 & 0 \\ 5 & -1 & 4 \end{bmatrix}$

16) $\begin{bmatrix} 0 & -4 & 3 \\ -4 & -3 & -1 \\ -1 & 2 & -2 \end{bmatrix}$

Critical Thinking Questions:

17) Give an example of a 2x2 matrix with no inverse.

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

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Answers

Inverse Matrices

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

12) $\begin{bmatrix} \frac{1}{7} & \frac{1}{14} \\ 0 & -\frac{1}{6} \end{bmatrix}$

13) $\begin{bmatrix} \frac{2}{9} & -\frac{1}{9} & -\frac{2}{9} \\ \frac{3}{2} & 0 & -1 \\ \frac{5}{18} & \frac{1}{9} & -\frac{5}{18} \end{bmatrix}$

14) No inverse exists

15) $\begin{bmatrix} -\frac{1}{5} & -\frac{1}{20} & \frac{1}{10} \\ \frac{1}{5} & -\frac{9}{20} & -\frac{1}{10} \\ \frac{3}{10} & -\frac{1}{20} & \frac{1}{10} \end{bmatrix}$

16) $\begin{bmatrix} -\frac{8}{5} & \frac{2}{5} & -\frac{13}{5} \\ \frac{7}{5} & -\frac{3}{5} & \frac{12}{5} \\ \frac{11}{5} & -\frac{4}{5} & \frac{16}{5} \end{bmatrix}$

17)

18)