

5

1. Carefully complete the following DEFINITION: The matrix B is an inverse of the matrix A

$AB=I$ and $BA=I$.
Square

most

2. Complete the following operations, if possible. If not possible, say so.

a. $\begin{bmatrix} 1 & 2 & -3 \\ 2 & 0 & 3 \end{bmatrix} + \begin{bmatrix} 2 & 0 & 3 \\ -1 & 2 & -4 \end{bmatrix} = \begin{bmatrix} 3 & 2 & 0 \\ 1 & 2 & -1 \end{bmatrix}$

add last 1

b. $3 \begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 0 \end{bmatrix} = \begin{bmatrix} 6 & 9 & 12 \\ 9 & 12 & 0 \end{bmatrix}$

all

c. $\begin{bmatrix} 2 & 3 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 2 & 1 \\ -2 & 3 \end{bmatrix} = \begin{bmatrix} -2 & 11 \\ -4 & 14 \end{bmatrix}$

add last 1

d. $\begin{bmatrix} 1 & 3 \\ 3 & 2 \end{bmatrix}^{-1} = \frac{1}{2-9} \begin{bmatrix} 2 & -3 \\ -3 & 1 \end{bmatrix} = \begin{bmatrix} -2/7 & 3/7 \\ 3/7 & -1/7 \end{bmatrix}$

2/4

e. $\begin{bmatrix} 2 & 3 & 0 \\ 2 & 3 & -1 \end{bmatrix}^t = \begin{bmatrix} 2 & 2 \\ 3 & 3 \\ 0 & -1 \end{bmatrix}$

2/3

f. $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & -1 \end{bmatrix} \begin{bmatrix} 2 & -1 & 0 \\ 2 & 3 & -1 \end{bmatrix} =$ not poss

all not all

g. $\begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \end{bmatrix} + \begin{bmatrix} 2 & -1 & 0 \\ 2 & 3 & -1 \end{bmatrix} =$ not poss

2/4

3. Give an example where $AB = 0$ but $A \neq 0$ and $B \neq 0$.

$\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

2/3

3. Find the inverse of the matrix

$\begin{bmatrix} 1 & 2 & 0 \\ 1 & 4 & 2 \\ -1 & 2 & 6 \end{bmatrix} \begin{bmatrix} 1 & 2 & 0 & | & 1 & 0 & 0 \\ 1 & 4 & 2 & | & 0 & 1 & 0 \\ -1 & 2 & 6 & | & 0 & 0 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 2 & 0 & | & 1 & 0 & 0 \\ 0 & 2 & 2 & | & -1 & 1 & 0 \\ 0 & 4 & 6 & | & 1 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 2 & 0 & | & 1 & 0 & 0 \\ 0 & 2 & 2 & | & -1 & 1 & 0 \\ 0 & 0 & 2 & | & 3 & -2 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 2 & 0 & | & 1 & 0 & 0 \\ 0 & 2 & 0 & | & -4 & 3 & -1 \\ 0 & 0 & 2 & | & 3 & -2 & 1 \end{bmatrix}$

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

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

2/3