

Matrix Operations and Their Applications

1. a) Give the order of each matrix
 b) If $A = [a_{ij}]$, identify a_{32} and a_{23} or explain why identification is not possible

$$\begin{bmatrix} -2 & 1 & 3 & 5 \\ 7 & -1 & 2 & -3 \\ 4 & -5 & 11 & -8 \end{bmatrix}$$

2. Find the following matrices:
 a) $A + B$, b) $A - B$, c) $-4A$, d) $3A + 2B$

$$A = \begin{bmatrix} -2 & 4 & 3 \\ -1 & 7 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 5 & -1 & -7 \\ 2 & -3 & 9 \end{bmatrix}$$

4. Solve each matrix equation for X:
 $X - B = A$

$$A = \begin{bmatrix} 4 & -1 \\ 5 & 2 \\ 1 & -2 \end{bmatrix} \quad B = \begin{bmatrix} 3 & -4 \\ 7 & 1 \\ -5 & 1 \end{bmatrix}$$

5. Solve each matrix equation for X:
 $2X + 5A = B$

$$A = \begin{bmatrix} 4 & -1 \\ 5 & 2 \\ 1 & -2 \end{bmatrix} \quad B = \begin{bmatrix} 3 & -4 \\ 7 & 1 \\ -5 & 1 \end{bmatrix}$$

7. Find (if possible) the following matrices:
 a) AB b) BA

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

8. Find (if possible) the following matrices:

a) AB b) BA

$$A = \begin{bmatrix} -2 \\ 4 \\ 1 \end{bmatrix} \quad B = [5 \quad -1 \quad 3]$$

9. Find (if possible) the following matrices:

a) AB b) BA

$$A = \begin{bmatrix} 1 & -2 \\ -3 & 4 \\ 5 & -1 \end{bmatrix} \quad B = \begin{bmatrix} 7 & 1 & 2 \\ 3 & -5 & -4 \end{bmatrix}$$

10. Perform the indicated matrix operations given that A , B , and C are defined as follows. If an operation is not defined, state the reason:

$A(B + C)$

$$A = \begin{bmatrix} 2 & 0 \\ -1 & 3 \\ -5 & 2 \end{bmatrix} \quad B = \begin{bmatrix} -1 & -4 \\ 2 & -7 \end{bmatrix} \quad C = \begin{bmatrix} 5 & 1 \\ 3 & -2 \end{bmatrix}$$