

1. Complete the following table.

Order of the matrix

A	B	$A \pm B$	AB
2×2	2×2		
2×3	3×2		
3×4	4×1		
3×3	3×3		
2×3		2×3	
	3×2		1×2
2×3		2×3	
1×3	3×2		

2. For $A = \begin{bmatrix} 6 & -5 \\ -7 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -3 \\ -2 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & 1 \\ 3 & -1 \end{bmatrix}$, show that

- Commutative property does not hold true for multiplication of matrices A and B i.e. $AB \neq BA$
- Associative property holds true for multiplication of three matrices, i.e. $A(BC) = (AB)C$

3. Consider $A = \begin{bmatrix} 1 & 3 & 4 \\ -2 & 1 & 2 \\ 3 & -2 & 1 \end{bmatrix}$ verify the $A.I = I.A = A$, where I is the identity matrix of order 3×3

4. If $A = \begin{bmatrix} 1 & -3 \\ -2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -4 \\ -1 & 3 \end{bmatrix}$ then show that

- $(A + B)' = (A)' + (B)'$
- $(AB)' = (B)'(A)'$

5. Do as directed

i) For $A = \begin{bmatrix} 6 & -5 \\ -7 & 4 \end{bmatrix}$, find $A^2 - 6A$

ii) Evaluate $\begin{bmatrix} 2 & 1 & 3 \end{bmatrix} \begin{bmatrix} -1 & 0 & -1 \\ -1 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$

iii) Find a matrix A such that $\begin{bmatrix} 1 & 2 & -1 \\ 0 & 4 & 9 \end{bmatrix} = \begin{bmatrix} 9 & -1 & 4 \\ -2 & 1 & 3 \end{bmatrix} - A$

iv) If the matrix $X = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$ is equal to the matrix $Y = \begin{bmatrix} p - q & 2p + r \\ 2p - q & 3r + s \end{bmatrix}$ then find value of p, q, r and s.

v) Let $P = \begin{bmatrix} 2 & -1 \\ 3 & 1 \end{bmatrix}$ and $Q = \begin{bmatrix} 1 & 4 \\ 7 & 2 \end{bmatrix}$ then calculate $3P - 2Q$.

6. If $A = \begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$, then find a matrix C, such that $3A - 2B + 4C = 0$

7. Given $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$, find:

i. $2A - 3B$

ii. AB

iii. BA

iv. $AB - BA$

8. For $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$ show that $A^3 - 23A - 40I = O$, where I is an identity matrix of order 3, and O is zero matrix

9. Two booksellers A and B sell the textbook of Mathematics and Applied Mathematics. In the month of march, bookseller A sold 250 books of Mathematics and 400 books of Applied Mathematics whereas bookseller B sold 230 books of Mathematics and 425 books of Applied Mathematics. In the month of April, bookseller A sold 550 books of Mathematics and 300 books of Applied Mathematics and bookseller B sold 270 books of Mathematics and 450 books of Applied Mathematics.

Represent the given information into matrix form and find the total sale for both the booksellers in the month of March and April, using matrix algebra.

10. Cost of a pen and a notebook are Rs.12 and Rs. 27 respectively. On a given day, shopkeeper P sells 5 pens and 7 notebooks, whereas shopkeeper Q sells 6 pens and 4 notebooks on a particular day. Find the income of both the shopkeepers, using matrix algebra