

Class – 10th

Topic – Matrices

- If $\begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} + 2 \begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$, find the values of x and y. [Ans: x = 2, y = -8]
- If $P = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$, $Q = \begin{bmatrix} 2 & 3 \\ -1 & 0 \end{bmatrix}$, find $P^2 + PQ$. [Ans: $\begin{bmatrix} 3 & 3 \\ 7 & 7 \end{bmatrix}$]
- If $\begin{bmatrix} 2 & 5 \\ -1 & 4 \end{bmatrix} + 2M = 3 \begin{bmatrix} 3 & 2 \\ 0 & -3 \end{bmatrix}$, find the matrix M. [Ans: $\begin{bmatrix} \frac{7}{2} & \frac{1}{2} \\ \frac{1}{2} & \frac{-13}{2} \end{bmatrix}$]
- Given $A = \begin{bmatrix} p & 0 \\ 0 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -q \\ 1 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 2 & -2 \\ 2 & 2 \end{bmatrix}$ and $BA = C^2$. Find the values of p and q. [Ans: p = 8, q = 4]
- Find x and y if $\begin{bmatrix} 2x & x \\ y & 3y \end{bmatrix} \begin{bmatrix} 3 \\ 2 \end{bmatrix} = \begin{bmatrix} 25 \\ 16 \end{bmatrix}$ z [Ans: x = $3\frac{1}{8}$, y = $1\frac{7}{9}$]
- As given, $A = \begin{bmatrix} -3 & 2 \\ 1 & -4 \end{bmatrix}$, $B = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$, $C = \begin{bmatrix} -5 \\ 4 \end{bmatrix}$ and $D = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$, find $AB + 2C - 4D$. [Ans: $\begin{bmatrix} -36 \\ -2 \end{bmatrix}$]
- Evaluate $\begin{bmatrix} 2\cos 60^\circ & 4\sin 30^\circ \\ 2\cos 0^\circ & \sin 90^\circ \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 5 & 4 \end{bmatrix}$ [Ans: $\begin{bmatrix} 14 & 13 \\ 13 & 14 \end{bmatrix}$]
- If $A = \begin{bmatrix} 3 & 5 \\ 4 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$, is the product AB possible? Give a reason. If yes, find AB. [Ans: $\begin{bmatrix} 26 \\ 0 \end{bmatrix}$]
- If $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$ and I is the identity matrix of the same order and A' is the transpose of the matrix A, find $A'.B + BI$. [Ans: $\begin{bmatrix} 11 & -3 \\ 16 & 2 \end{bmatrix}$]
- Find the matrix M such that $M \times \begin{bmatrix} 3 & -4 \\ 0 & 2 \end{bmatrix} = \begin{bmatrix} 3 & 8 \end{bmatrix}$. [Ans: M = $\begin{bmatrix} 1 & 6 \end{bmatrix}$]
- If $2A - 2 \begin{bmatrix} 1 & 5 \\ -3 & 7 \end{bmatrix} = \begin{bmatrix} 4 & 0 \\ 1 & -3 \end{bmatrix}$, find the matrix A. [Ans: $\begin{bmatrix} 3 & 5 \\ -2.5 & 5.5 \end{bmatrix}$]
- $A = \begin{bmatrix} 1 & 2 \\ -3 & -4 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 0 \\ 4 & -5 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 2 \\ -15 & 11 \end{bmatrix}$. Find K such that $KB = C - A$. [Ans: K = -3]
- If $2 \begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$, find the values of x and y. [Ans: x = 2, y = -8]
- Find $\begin{bmatrix} \sin^2 30^\circ & \cos^2 45^\circ \\ \sin 0^\circ & \cos 90^\circ \end{bmatrix} \begin{bmatrix} \cos 0^\circ & \cos 90^\circ \\ \sin 0^\circ & \sin 90^\circ \end{bmatrix}$. [Ans: $\begin{bmatrix} 1 & 1 \\ 4 & 2 \end{bmatrix}$]
- If $A = \begin{bmatrix} 2 & 3 \\ -1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 7 & 15 \\ -5 & -3 \end{bmatrix}$, find values of scalar factors x and y such that $xA^2 + yA = B$. [Ans: x = 1, y = 3]

16. Let $M \times \begin{bmatrix} 3 & -4 \\ 0 & 7 \end{bmatrix} = [6 \quad 17]$, where M a matrix is. Find the matrix M.

[Ans: $\begin{bmatrix} 2 & \frac{25}{7} \end{bmatrix}$]

17. If $A = \begin{bmatrix} 3 & 0 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -5 \\ 3 & 1 \end{bmatrix}$, $C = \begin{bmatrix} 2 & -3 \\ 4 & 5 \end{bmatrix}$, find

(i) $A(BC)$

[Ans: $-\begin{bmatrix} 48 & 93 \\ 22 & 66 \end{bmatrix}$]

(ii) $(AB)C$

[Ans: $-\begin{bmatrix} 48 & 93 \\ 22 & 66 \end{bmatrix}$]

(iii) Is $A(BC) = (AB)C$?

Does it possess associative property?