

Q.1: Which of the following product of matrices is conformable for multiplication ?

(i). $\begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} -2 \\ 3 \end{bmatrix}$

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

(iii). $\begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \begin{bmatrix} 0 & 1 \\ -1 & 2 \end{bmatrix}$

(iv). $\begin{bmatrix} 1 & 2 \\ 0 & -1 \\ -1 & -2 \end{bmatrix} \begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \end{bmatrix}$

(v). $\begin{bmatrix} 3 & 2 & 1 \\ 0 & 1 & -1 \end{bmatrix} \begin{bmatrix} 1 & -1 \\ 0 & 2 \\ -2 & 3 \end{bmatrix}$

Q.2: If $A = \begin{bmatrix} 3 & 0 \\ -1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 6 \\ 5 \end{bmatrix}$, find (i) AB and (ii) BA (if possible).

Q.3: Find the product of following matrices:

(i). $\begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 4 \\ 0 \end{bmatrix}$

(iii). $\begin{bmatrix} 3 & 0 \\ 3 & 0 \end{bmatrix} \begin{bmatrix} 4 \\ 0 \end{bmatrix}$

(ii). $\begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 5 \\ -4 \end{bmatrix}$

(iv). $\begin{bmatrix} 6 & -0 \\ 6 & -0 \end{bmatrix} \begin{bmatrix} 4 \\ 0 \end{bmatrix}$

(v). $\begin{bmatrix} 1 & 2 \\ -3 & 0 \\ 6 & -1 \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 0 & -4 \end{bmatrix}$

Q.4: Multiply the following matrices.

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

b) $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ -1 & 1 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ -1 & -1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$

d) $\begin{bmatrix} 8 & 5 \\ 6 & 4 \end{bmatrix} \begin{bmatrix} 2 & -5 \\ -4 & 4 \end{bmatrix}$

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

Q.5: Let $A = \begin{bmatrix} -1 & 3 \\ 2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ -3 & -5 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$, verify whether:

(i). $AB = BA$

(ii). $A(BC) = (AB)C$

(iii). $A(B + C) = AB + AC$

(iv). $A(B - C) = AB - AC$

Q.6: For the matrices $A = \begin{bmatrix} -1 & 3 \\ 2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ -3 & -5 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & 6 \\ 3 & -9 \end{bmatrix}$, Verify that:

(i). $(AB)^t = B^t A^t$

(ii). $(BC)^t = B^t C^t$