

Date:
 Page No:
Multiplication of Matrices

Rules: -

example: - $\begin{bmatrix} 1 & 7 \\ 2 & 4 \end{bmatrix} \times \begin{bmatrix} 3 & 3 \\ 5 & 2 \end{bmatrix}$

Let $a_1 \rightarrow \begin{bmatrix} 1 & 7 \\ 2 & 4 \end{bmatrix}$ \times $\begin{bmatrix} 3 & 3 \\ 5 & 2 \end{bmatrix}$
 $a_2 \rightarrow$ b_1 b_2
 \downarrow \downarrow

$\Rightarrow \begin{bmatrix} a_1 \times b_1 & a_1 \times b_2 \\ a_2 \times b_1 & a_2 \times b_2 \end{bmatrix}$

$\Rightarrow \begin{bmatrix} 1 \times 3 & 7 \times 3 \\ 2 \times 5 & 4 \times 2 \end{bmatrix}$

$\Rightarrow \begin{bmatrix} 3 & 21 \\ 10 & 8 \end{bmatrix}$

$\therefore \begin{bmatrix} 1 & 7 \\ 2 & 4 \end{bmatrix} \times \begin{bmatrix} 3 & 3 \\ 5 & 2 \end{bmatrix} = \begin{bmatrix} 3 & 21 \\ 10 & 8 \end{bmatrix}$

▲ For multiplication to be defined the "inner" numbers must match. The result will be determined by the "outer" numbers.

Example! -
$$\begin{bmatrix} 2 & 1 & 4 \\ 0 & 1 & 1 \end{bmatrix}_{2 \times 3} \times \begin{bmatrix} 6 & 3 & -1 & 0 \\ 1 & 1 & 0 & 4 \\ -2 & 5 & 0 & 2 \end{bmatrix}_{3 \times 4}$$

So here according to statement, inner numbers must match, so here in 1st matrix the inner number is 3 and in the 2nd matrix the inner number is also 3, so here multiplication is possible. And after multiplication we will get the matrix of an order 2x4.

