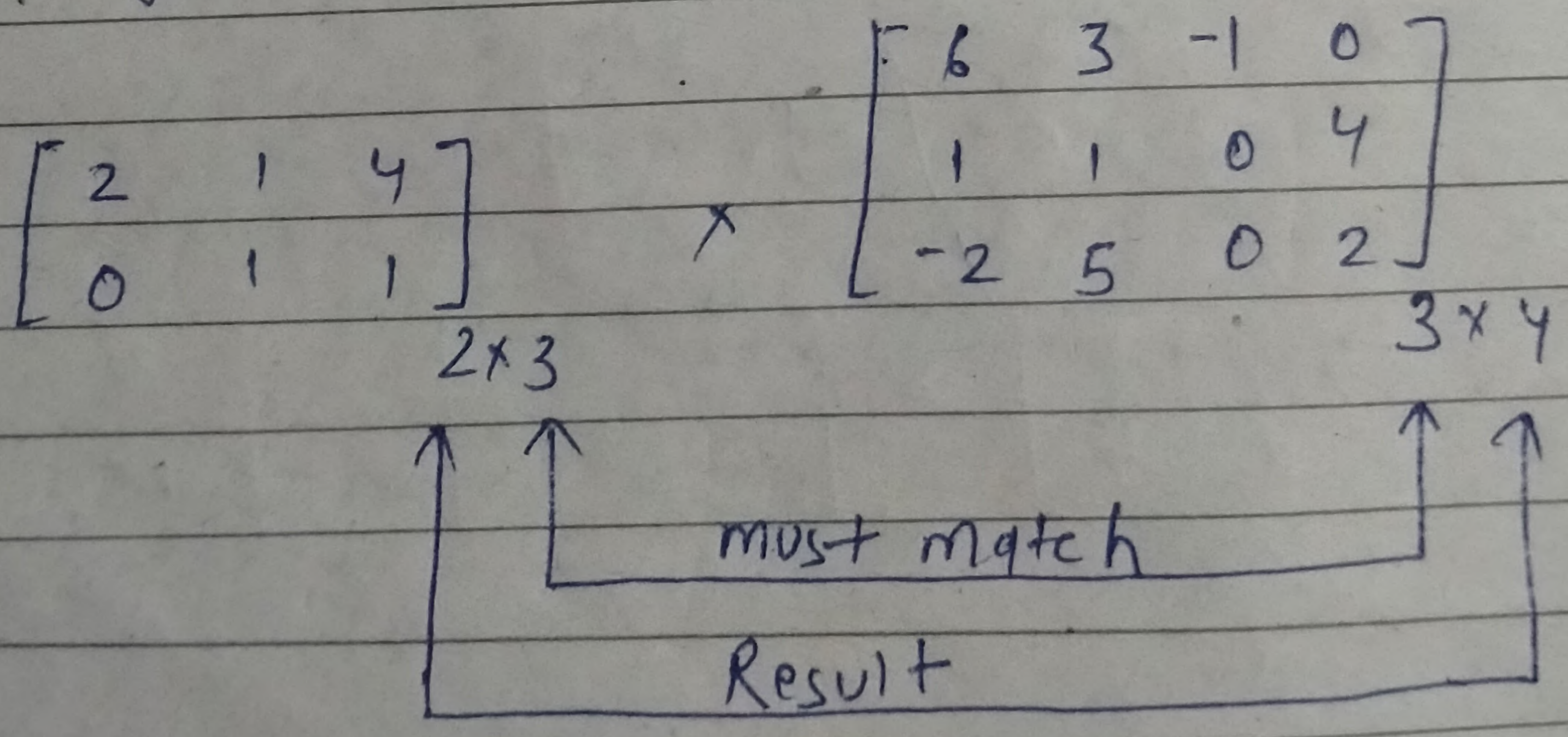


▲ For multiplication to be defined the "inner" numbers must match. The result will be determined by the "outer" numbers.

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.



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

let,

$b_1 \quad b_2 \quad b_3 \quad b_4$
 $\uparrow \quad \uparrow \quad \uparrow \quad \uparrow$

$a_1 \rightarrow \begin{bmatrix} 2 & 1 & 4 \\ 0 & 1 & 1 \end{bmatrix} \times \begin{bmatrix} 6 & 3 & -1 & 0 \\ 1 & 1 & 0 & 4 \\ -2 & 5 & 0 & 2 \end{bmatrix}$
 $a_2 \rightarrow$

$$\left[\begin{array}{cccc} a_1 b_1 + a_1 b_1 + a_1 b_1 & a_1 b_2 + a_1 b_2 + a_1 b_2 & a_1 b_3 + a_1 b_3 + a_1 b_3 & a_1 b_4 + a_1 b_4 + a_1 b_4 \\ a_2 b_1 + a_2 b_1 + a_2 b_1 & a_2 b_2 + a_2 b_2 + a_2 b_2 & a_2 b_3 + a_2 b_3 + a_2 b_3 & a_2 b_4 + a_2 b_4 + a_2 b_4 \end{array} \right]$$

Putting the values,

$$\left[\begin{array}{cccc} 2 \cdot 6 + 1 \cdot 1 + 4 \cdot (-2) & 2 \cdot 3 + 1 \cdot 1 + 4 \cdot 5 & 2 \cdot (-1) + 1 \cdot 0 + 4 \cdot 0 & 2 \cdot 0 + 1 \cdot 4 + 4 \cdot 2 \\ 0 \cdot 6 + 1 \cdot 1 + 1 \cdot (-2) & 0 \cdot 3 + 1 \cdot 1 + 1 \cdot 5 & 0 \cdot (-1) + 1 \cdot 0 + 1 \cdot 0 & 0 \cdot 0 + 1 \cdot 4 + 1 \cdot 2 \end{array} \right]$$

$$\left[\begin{array}{cccc} 12 + 1 - 8 & 6 + 1 + 20 & -2 + 0 + 0 & 0 + 4 + 8 \\ 0 + 1 - 2 & 0 + 1 + 5 & 0 + 0 + 0 & 0 + 4 + 2 \end{array} \right]$$

$$\left[\begin{array}{cccc} 5 & 27 & -2 & 12 \\ -1 & 6 & 0 & 6 \end{array} \right]_{2 \times 4}$$