Operation on matrix

1- Matrix addition

If A =[aij] and B= [bij] are mxn matrices , the sum of A and B is the mxn matrix C = [cij] defined by .

eij= aij + bij $(1 \leq i \leq m, 1 \leq j \leq n)$

Ex// let A = $\begin{bmatrix} 1 & -2 & 4 \\ 2 & -1 & 3 \end{bmatrix}$ and $\begin{bmatrix} 0 & 2 & -4 \\ 1 & 3 & 1 \end{bmatrix}$ $then\ A + B = \begin{bmatrix} 1 & 0 & 0 \\ 3 & 2 & 4 \end{bmatrix}$

2- Ex// A = $\begin{bmatrix} -1 & 0 & 2 \\ 4 & 5 & -3 \end{bmatrix}$ $and\ B = \begin{bmatrix} 2 & 4 & 7 \\ 1 & -6 & -1 \end{bmatrix}$

Find A – B

A – B = A + (-B)

= $\begin{bmatrix} -1 & 0 & 2 \\ 4 & 5 & -3 \end{bmatrix} + \begin{bmatrix} -2 & -4 & -7 \\ -1 & 6 & 1 \end{bmatrix}$

= $\begin{bmatrix} -3 & -4 & -5 \\ 3 & 11 & -2 \end{bmatrix}$

2-Matirx Multiplication

If A = [a_{ij}] is an mXp matrix and B = [b_{ij}] is a pXn matrix , then the product of A and B is the mXn matrix C =[c_{ij}] defined by:

Cij= $a_{i1}b_{1j} + a_{i2}b_{2j} + \ldots\ldots\ldots\ldots + a_{ip}b_{pj}$ $(1 \leq I \leq m, 1 \leq j \leq n)$

Ex // let A=$\begin{bmatrix} 1 & 2 & -1 \\ 3 & 1 & 4 \end{bmatrix}_{2X3}$ and B=$\begin{bmatrix} -2 & 5 \\ 4 & -3 \\ 2 & 1 \end{bmatrix}_{3X2}$

Then

AB = $\begin{bmatrix} (1)(-2) + (2)(4) + (-1)(2) & (1)(5) + (2)(-3) + (-1)(1) \\ (3)(-2) + (1)(4) + (4)(2) & (3)(5) + (1)(-3) + (4)(1) \end{bmatrix}$

= $\begin{bmatrix} 4 & -2 \\ 6 & 16 \end{bmatrix}$

Ex// A = $\begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ $and\ B = \begin{bmatrix} 2 & 1 \\ 0 & 1 \end{bmatrix}$

AB = $\begin{bmatrix} 2 & 3 \\ -2 & 2 \end{bmatrix}$

BA = $\begin{bmatrix} 1 & 7 \\ -1 & 3 \end{bmatrix}$ AB ≠ BA