

## Mathematics Assignment For Class X

**General Directions For Students :** Whatever be the notes provided , everything must be copied in the maths copy and then do the homework in the same copy

### Chapter 8: Matrices (Part -2)

**Topic :** Operations on Matrices

**Addition of Matrices :** Two matrices can only be added if they are of the same order. The addition or sum of two matrices A and B , i.e. , A+B is found by adding their corresponding elements, and therefore , the sum is also a matrix of the same order

**Properties of addition of matrix:** If A , B & c are matrices of same order , then

- $A+B=B+A$ ..... (addition of matrix is commutative)
- $(A+B)+C=A+(B+C)$ ..... ( addition of matrix is associative)
- $A+O=A=O+A$ , where O is the zero matrix of order equal to A
- $A+(-A)=O$  or  $(-A)+A=O$  , where O is zero matrix of order of A i.e. The matrix -A is called additive inverse of matrix A.

**Subtraction of matrices:** Two matrices can only be subtracted if they are of the same order. The subtraction or the difference of two matrices A and B , i.e. , A-B is found by subtracting the elements of B from corresponding elements of A, and therefore , the difference is also a matrix of the same order.

**Solving Matrix equations:** Suppose we have to solve equations  $X+A=B$  for the unknown matrix X. We do exactly what we learn to do with numbers. Add the matrix -A to both sides .

This gives  $X+A+(-A)=B+(-A)$ ,  $\Rightarrow X+O=B-A$  [  $\because A+(-A)=O$  ]

$\therefore X=B-A$  , which is the required solution

**Multiplication of a Matrix by a scalar Quantity (Real Number) :** To Multiply a Matrix by a scalar Quantity means to multiply each of its element by this scalar quantity. **For example**

$$3 \begin{bmatrix} 2 & 6 \\ 7 & 0 \end{bmatrix} = \begin{bmatrix} 3 \times 2 & 3 \times 6 \\ 3 \times 7 & 3 \times 0 \end{bmatrix} = \begin{bmatrix} 6 & 18 \\ 21 & 0 \end{bmatrix}$$

**Exercise 8.2 Q1.** Given  $M = \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix}$  and  $N = \begin{bmatrix} 2 & 0 \\ -1 & 2 \end{bmatrix}$ , Find  $M+2N$

**Solution.** Given  $M+2N = \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix} + 2 \begin{bmatrix} 2 & 0 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix} + \begin{bmatrix} 4 & 0 \\ -2 & 4 \end{bmatrix}$

$$= \begin{bmatrix} 2+4 & 0+0 \\ 1+(-2) & 2+4 \end{bmatrix} = \begin{bmatrix} 6 & 0 \\ -1 & 6 \end{bmatrix}$$

**Exercise 8.2 Q6.i)** If  $A = \begin{bmatrix} 0 & -1 \\ 1 & 2 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 2 \\ -1 & 1 \end{bmatrix}$ . Find matrix X if  $3A+X=B$

**Solution .**  $3A+X=B \Rightarrow X=B-3A$

$$\Rightarrow x = \begin{bmatrix} 1 & 2 \\ -1 & 1 \end{bmatrix} - 3 \begin{bmatrix} 0 & -1 \\ 1 & 2 \end{bmatrix} \Rightarrow x = \begin{bmatrix} 1 & 2 \\ -1 & 1 \end{bmatrix} - \begin{bmatrix} 0 & -3 \\ 3 & 6 \end{bmatrix}$$

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

Homework: Exercise 8.2

Q.2, Q.4ii), Q.5, Q6ii), Q9,Q12,Q.15