

## Mathematics Worksheet No. 1

Class 12

### Chapter: Matrix

A rectangular arrangement of  $mn$  elements in the form of an ordered set of  $m$  rows, each row consisting of an ordered set of  $n$  elements is called  $m \times n$  matrix ( $m \times n$  read as  $m$  by  $n$ )

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}, \text{ where } m \text{ denotes the number of rows and } n, \text{ the number of columns}$$

In short form matrix is written as  $A = [a_{ij}]_{m \times n}$ ,  $1 \leq i \leq m, 1 \leq j \leq n$

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, B = \begin{bmatrix} e & f \\ g & h \end{bmatrix} \text{ then } A + B = \begin{bmatrix} a+e & b+f \\ c+g & d+h \end{bmatrix}, \text{ and } A - B = \begin{bmatrix} a-e & b-f \\ c-g & d-h \end{bmatrix}$$

$$\text{And } AB = \begin{bmatrix} ae+bg & af+bh \\ ce+dg & cf+dh \end{bmatrix}$$

Solve the following questions

1. If a matrix has 16 elements, what are the possible orders it can have ?

2. Find the value of  $x, y$  and  $z$  if  $\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$

3. Can you find the values of  $x$  and  $y$  so that the matrices  $\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}$  and  $\begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$  may be equal.

4. If  $A, B$  and  $C$  are three matrices such that  $A + B = A + C$ , then show that  $B = C$ .

5. Find matrix  $X$  such that  $3A - 2B + X = 0$  where  $A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} -2 & 1 \\ 3 & 2 \end{bmatrix}$

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

7. If  $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ , then show that  $A^2 - 3I = 2A$  where  $I$  is an identity matrix.