

## 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 -4)

**Topic :** Multiplication Of Matrices (Exercise 8.3 continued)

**Exercise 8.3 Q.20.** If  $A = \begin{bmatrix} 1 & 1 \\ x & x \end{bmatrix}$ , Find x if  $A^2 = O$

$$A^2 = AA = \begin{bmatrix} 1 & 1 \\ x & x \end{bmatrix} = \begin{bmatrix} 1.1+1.x & 1.1+1.x \\ x+x.x & x+x.x \end{bmatrix} = \begin{bmatrix} 1+x & 1+x \\ x+x^2 & x+x^2 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 1+x & 1+x \\ x+x^2 & x+x^2 \end{bmatrix} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$\Rightarrow a_{11} = 1+x=0 \Rightarrow x=-1$$

$$\text{also } x+x^2=0 \Rightarrow x(x+1)=0 \Rightarrow x=0,-1$$

$x=0$  will not satisfy  $1+x=0$

Therefore  $x = -1$

**Exercise 8.3 .Q.22 ii)** Find x and y if  $\begin{bmatrix} 2x & x \\ y & 3y \end{bmatrix} \begin{bmatrix} 3 \\ 2 \end{bmatrix} = \begin{bmatrix} 16 \\ 9 \end{bmatrix}$

$$\text{Given } \begin{bmatrix} 2x & x \\ y & 3y \end{bmatrix} \begin{bmatrix} 3 \\ 2 \end{bmatrix} = \begin{bmatrix} 16 \\ 9 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 2x.3+2x \\ y.3+3y.2 \end{bmatrix} = \begin{bmatrix} 16 \\ 9 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 6x+2x \\ 3y+6y \end{bmatrix} = \begin{bmatrix} 16 \\ 9 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 8x \\ 9y \end{bmatrix} = \begin{bmatrix} 16 \\ 9 \end{bmatrix}$$

$$a_{11} = 8x=16 \Rightarrow x=2 \text{ and } 9y=9 \Rightarrow y=1$$

$\therefore x=2, y=1$

**Exercise 8.3 Q.27.** If  $A = \begin{bmatrix} 2 & x \\ 0 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 4 & 36 \\ 0 & 1 \end{bmatrix}$ , find the value of x, given  $A^2 = B$

$$A^2 = \begin{bmatrix} 2 & x \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 2 & x \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 2.2 + x.0 & 2.x + x.1 \\ 0.2 + 1.0 & 0.x + 1.1 \end{bmatrix} = \begin{bmatrix} 4 & 3x \\ 0 & 1 \end{bmatrix}$$

$$\text{Given } A^2 = B \Rightarrow \begin{bmatrix} 4 & 3x \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & 36 \\ 0 & 1 \end{bmatrix}$$

$$\Rightarrow a_{12} = 3x = 36 \Rightarrow x = 12 \text{ Ans}$$

**Exercise 8.3. Q.32.** If  $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ , find  $x, y$  so that  $A^2 = xA + yI$

$$A^2 = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 2.2 + 3.1 & 2.3 + 3.2 \\ 1.2 + 2.1 & 1.3 + 2.2 \end{bmatrix} = \begin{bmatrix} 7 & 12 \\ 4 & 7 \end{bmatrix}$$

$$xA + yI = x \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix} + y \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 2x & 3x \\ x & 2x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 0 & y \end{bmatrix} = \begin{bmatrix} 2x + y & 3x \\ x & 2x + y \end{bmatrix}$$

$$\text{Given } A^2 = xA + yI \Rightarrow \begin{bmatrix} 7 & 12 \\ 4 & 7 \end{bmatrix} = \begin{bmatrix} 2x + y & 3x \\ x & 2x + y \end{bmatrix}$$

$$a_{12} = 12 = 3x \Rightarrow x = 4,$$

$$a_{11} = 7 = 2x + y \Rightarrow 2(4) + y = 7$$

$$\Rightarrow y = 7 - 8 \Rightarrow y = -1$$

$$\therefore x = 4, y = -1$$

**Homework:**

**Exercise 8.3 Q17, Q.19, Q.22, Q.23, Q.28, Q.36, Q37i)**

**Please note:** Solution of Q.16, Q.18, Q.34, Q.35, Q.38 is discussed in the video link given to you with this assignment