## Assignment 2

## Vishal Vijay Devadiga (CS21BTECH11061)

## **Question:**

If the matrix  $\begin{pmatrix} 6 & -x^2 \\ 2x - 15 & 10 \end{pmatrix}$  is symmetric, then find the value of x.

## **Solution:**

For a symmetric matrix,  $\mathbf{A}^{\top} = \mathbf{A}$ . This implies,  $a_{ij} = a_{ji}$  for all i,j. Thus, for the matrix  $\mathbf{A}$ ,

$$a_{12} = a_{21} \tag{1}$$

$$2x - 15 = -x^2 \tag{2}$$

$$x^2 + 2x - 15 = 0 (3)$$

$$x^2 + 5x - 3x - 15 = 0 (4)$$

$$x(x+5) - 3(x+5) = 0 (5)$$

$$(x-3)(x+5) = 0 (6)$$

The roots of the equation  $x^2 + 2x - 15 = 0$  are -5 and 3.

Thus, the values of x for which the matrix  $\begin{pmatrix} 6 & -x^2 \\ 2x - 15 & 10 \end{pmatrix}$  is symmetric, is -5 and 3.