

# Assignment 2

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Download all python codes from

<https://github.com/KUSUMAPRIYAPULAVARTY/assignment2/tree/master/codes>

and latex-tikz codes from

<https://github.com/KUSUMAPRIYAPULAVARTY/assignment2>

Multiplying both sides of Equation (3.0.1) by

$\begin{pmatrix} 3 & -5 \\ 5 & 3 \end{pmatrix}^{-1}$ , we have

$$\begin{pmatrix} x \\ -y \end{pmatrix} = \begin{pmatrix} -6 & -24 \\ 24 & -6 \end{pmatrix} \begin{pmatrix} 3 & -5 \\ 5 & 3 \end{pmatrix}^{-1} \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (3.0.3)$$

$$= \frac{1}{34} \begin{pmatrix} -6 & -24 \\ 24 & -6 \end{pmatrix} \begin{pmatrix} 3 & 5 \\ -5 & 3 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (3.0.4)$$

$$= \frac{1}{34} \begin{pmatrix} 102 & -102 \\ 102 & 102 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (3.0.5)$$

$$= \begin{pmatrix} 3 & -3 \\ 3 & 3 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (3.0.6)$$

$$\Rightarrow \begin{pmatrix} x \\ -y \end{pmatrix} = \begin{pmatrix} 3 \\ 3 \end{pmatrix} \quad (3.0.7)$$

$$\text{Therefore, } x = 3, \quad (3.0.8)$$

$$y = -3 \quad (3.0.9)$$

## 1 QUESTION No. 15

Find the real numbers  $x, y$  such that  $\begin{pmatrix} x \\ -y \end{pmatrix} \begin{pmatrix} 3 \\ 5 \end{pmatrix}$  is conjugate of  $\begin{pmatrix} -6 \\ -24 \end{pmatrix}$

## 2 EXPLANATION

The matrix representation of a complex number

$$\begin{pmatrix} a \\ b \end{pmatrix} \text{ is } \begin{pmatrix} a & -b \\ b & a \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (2.0.1)$$

Conjugate of a complex number

$$\begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} a \\ -b \end{pmatrix} \quad (2.0.2)$$

## 3 SOLUTION

The conjugate of  $\begin{pmatrix} -6 \\ -24 \end{pmatrix}$  is  $\begin{pmatrix} -6 \\ 24 \end{pmatrix}$

$$\Rightarrow \begin{pmatrix} x \\ -y \end{pmatrix} \begin{pmatrix} 3 \\ 5 \end{pmatrix} = \begin{pmatrix} -6 \\ 24 \end{pmatrix} \quad (3.0.1)$$

Using equivalent matrices for complex numbers, we have

$$\begin{pmatrix} x \\ -y \end{pmatrix} \begin{pmatrix} 3 & -5 \\ 5 & 3 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \begin{pmatrix} -6 & -24 \\ 24 & -6 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (3.0.2)$$