# Question: 11.11.1.15

Nikam Pratik Balasaheb (EE21BTECH11037)

## 1 Problem

Does the point $\begin{pmatrix}-2.5\\3.5\end{pmatrix}$ lie inside, outside or on the circle $x^2+y^2=25$ ?

## 2 Solution

Given circle equation is,

$$\|\mathbf{x}\|^2 = 25 \tag{2.0.1}$$

For point $\mathbf{x}$ and circle with center $\mathbf{O}$ and radius $r$,

| Condition | Inference |
|---|---|
| $\|\mathbf{x}-\mathbf{O}\|^2 < r^2$ | Point lies inside the circle |
| $\|\mathbf{x}-\mathbf{O}\|^2 > r^2$ | Point lies outside the circle |
| $\|\mathbf{x}-\mathbf{O}\|^2 < r^2$ | Point lies on the circle |

TABLE 0: Table1

Here,

$$\|\mathbf{x}-\mathbf{O}\|^2 = \left\|\begin{pmatrix}-2.5\\3.5\end{pmatrix}\right\|^2 = 18.5 \tag{2.0.2}$$

$$r^2 = 25 \tag{2.0.3}$$

$$\implies \|\mathbf{x}-\mathbf{O}\|^2 < r^2 \tag{2.0.4}$$

Therefore, the point lies inside the given circle.

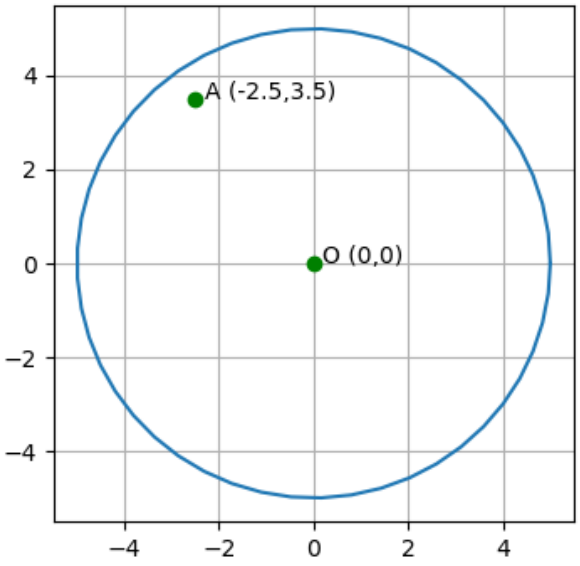


Fig. 0: Figure 1