Question: 11.11.1.15

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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.

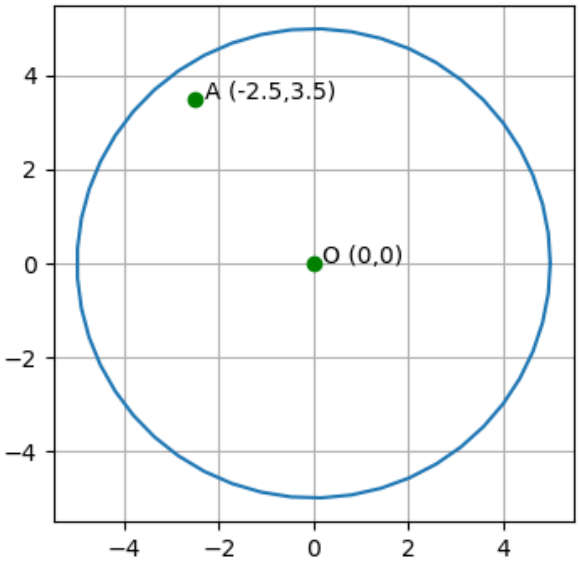

Fig. 0: Figure 1