

7-7.2-28

AI24BTECH11003 - Vijaya Sreyas

Question:

The point $\mathbf{P}(-2, 4)$ lies on circle of radius 6 and center $\mathbf{C}(3, 5)$.

Solution:

Information	Symbolic Form	Value
Given Point	\mathbf{P}	$\begin{pmatrix} -2 \\ 4 \end{pmatrix}$
Center of Circle	\mathbf{C}	$\begin{pmatrix} 3 \\ 5 \end{pmatrix}$
Radius of Circle	r	6

TABLE 0: Final Information

Substituting numerical values in (??),

$$u = -\begin{pmatrix} 3 \\ 5 \end{pmatrix}, f = -2 \quad (0.1)$$

The equation of the circle is then obtained as

$$\|\mathbf{x}\|^2 - 2\begin{pmatrix} 3 & 5 \end{pmatrix} \mathbf{x} - 2 = 0 \quad (0.2)$$

By now substituting the point \mathbf{P} in this equation, we can check where \mathbf{P} is relative to the circle, as per (??)

$$= \left\| \begin{pmatrix} -2 \\ 4 \end{pmatrix} \right\|^2 - 2\begin{pmatrix} 3 & 5 \end{pmatrix} \begin{pmatrix} -2 \\ 4 \end{pmatrix} - 2 \quad (0.3)$$

$$= 20 - 28 - 2 \quad (0.4)$$

$$= -10 < 0 \quad (0.5)$$

\therefore we can say that the point \mathbf{P} does not lie on the mentioned circle, but rather, inside the circle.

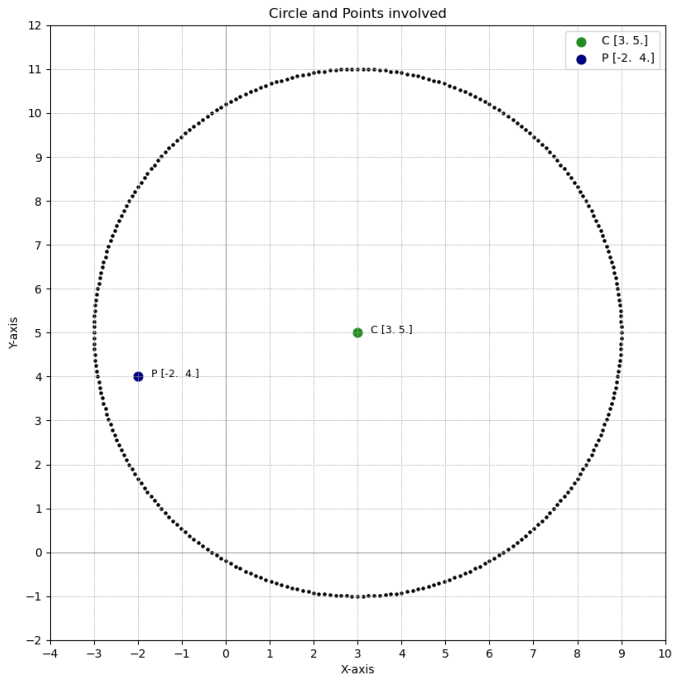


Fig. 0.1: Circle and Points