4.4.2.14

EE24BTECH11010 - Balaji B

Question:
$x^2 + y^2 - 4x - 8y - 45 = 0$
Solution:

Variable	Description
$\mathbf{c}$	Centre of the Circle
r	Radius of the circle
$\mathbf{u}$	Negative of Centre
f	Constant of the circle

TABLE I: Variables Used

The given circle can be expressed as

$$\|\mathbf{x}\|^2 + 2\begin{pmatrix}-2 & -4\end{pmatrix}\mathbf{x} - 45 = 0 \tag{1}$$

where

$$\mathbf{u} = \begin{pmatrix}-2\\-4\end{pmatrix}, f = -45 \tag{2}$$

$$\mathbf{u} = -\mathbf{c} \tag{3}$$

$$\therefore \mathbf{c} = \begin{pmatrix}2\\4\end{pmatrix} \tag{4}$$

$$r = \sqrt{\|u\|^2 - f} \tag{5}$$

$$r = \sqrt{4 + 16 + 45} \tag{6}$$

$$r = \sqrt{65} \tag{7}$$

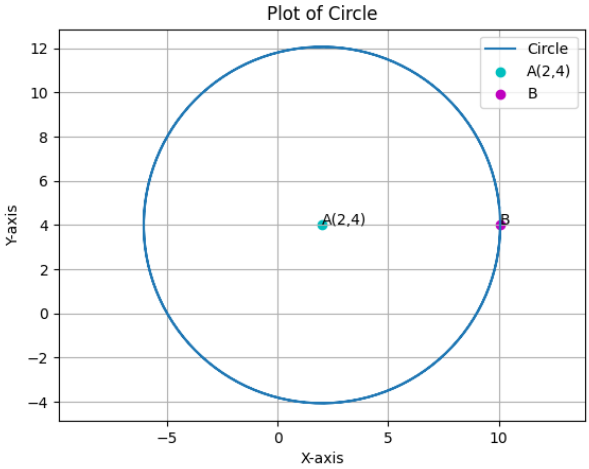

Fig. 1: Plot of the Circle