

CLASS-11
CHAPTER-11
CIRCLES

Excercise 11.1

Q2. Find the equation of the circle with centre $(-2, 3)$ and radius 4.

Solution:

Given

$$\mathbf{c} = \begin{pmatrix} -2 \\ 3 \end{pmatrix} \text{ and } r = 4 \quad (1)$$

The equation of the circle is given as

$$\|\mathbf{x}\|^2 + 2\mathbf{u}^\top \mathbf{x} + f = 0 \quad (2)$$

Where,

$$\mathbf{u} = -\mathbf{c} \text{ and } f = \|\mathbf{u}\|^2 - r^2 \quad (3)$$

$$\mathbf{u} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}, \mathbf{u}^\top = (2 \quad -3), \|\mathbf{u}\| = \sqrt{13} \quad (4)$$

$$f = \|\mathbf{u}\|^2 - r^2 = -1 \quad (5)$$

Substituting those values in the equation of circle, we get:

$$\|\mathbf{x}\|^2 + 2\mathbf{u}^\top \mathbf{x} - 1 = 0 \quad (6)$$

$$\|\mathbf{x}\|^2 + 2(2 \quad -3) \mathbf{x} = 1 \quad (7)$$

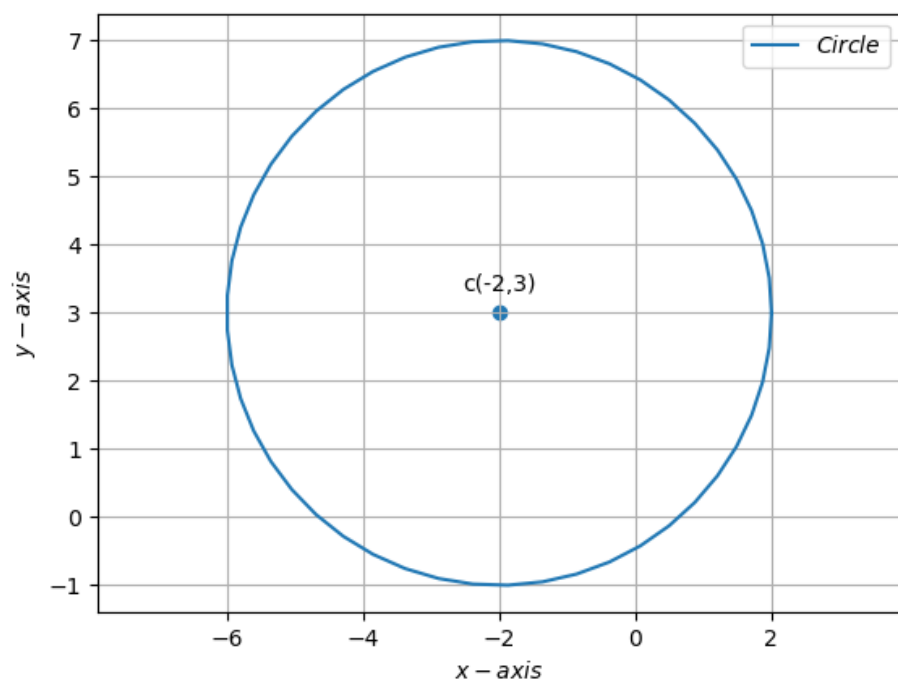


Figure 1: