

CHAPTER-11
CIRCLES

Exercise 11.1

Q1. Find the equation of the circle with centre $(0, 2)$ and radius 2.

Solution: Given

$$\mathbf{c} = \begin{pmatrix} 0 \\ 2 \end{pmatrix} \text{ and } r = 2 \quad (1)$$

We know the equation of the circle is given as

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

where,

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

So, here

$$\mathbf{u} = \begin{pmatrix} 0 \\ -2 \end{pmatrix} \quad (4)$$

$$\|\mathbf{u}\| = \sqrt{0^2 + 2^2} = 2 \quad (5)$$

$$f = \|\mathbf{u}\|^2 - r^2 \quad (6)$$

$$= 2^2 - 2^2 = 0 \quad (7)$$

Now substituting the values the equation of circle can be given as

$$\|\mathbf{x}\|^2 + 2\mathbf{u}^\top \mathbf{x} = 0 \quad (8)$$

$$\text{where } \mathbf{u} = \begin{pmatrix} 0 \\ -2 \end{pmatrix} \quad (9)$$

As shown in Figure 1

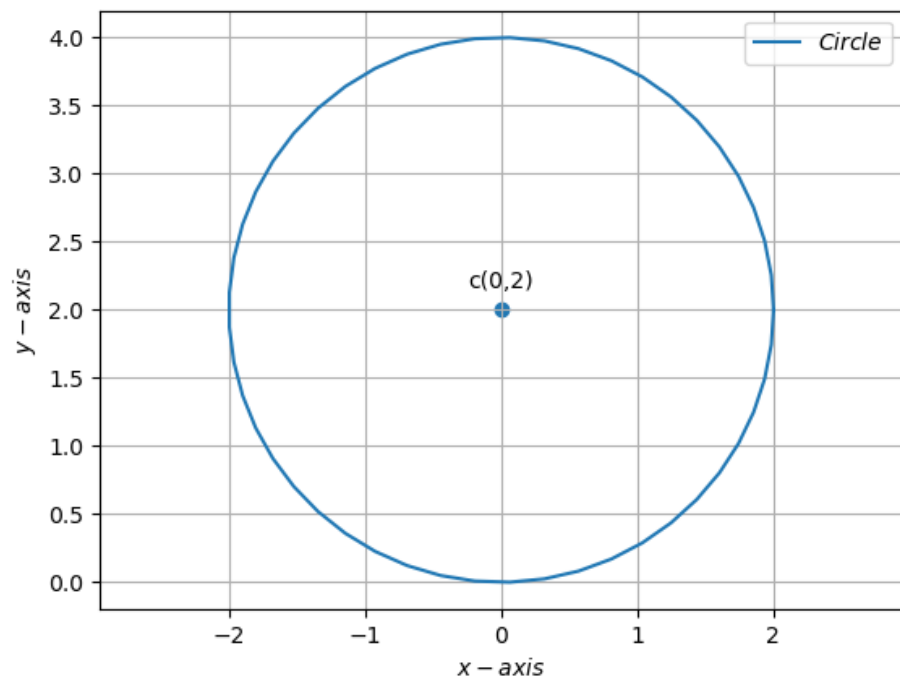


Figure 1: