CHAPTER-11
CIRCLES

Excercise 11.1

Q4.Find the equation of the circle with centre $(1, 1)$ and radius $\sqrt{2}$.
Solution: Given

$$\mathbf{c} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \text{ and } r = \sqrt{2} \tag{1}$$

We know the equation of the circle is given as

$$\|\mathbf{x}\|^2 + 2\mathbf{u}^\top \mathbf{x} + f = 0 \tag{2}$$

So, here

$$\mathbf{u} = -\mathbf{c} \tag{3}$$
$$= \begin{pmatrix} -1 \\ -1 \end{pmatrix} \tag{4}$$
$$f = \|\mathbf{u}\|^2 - r^2 \tag{5}$$
$$= \begin{pmatrix} -1 & -1 \end{pmatrix} \begin{pmatrix} -1 \\ -1 \end{pmatrix} - 2 \tag{6}$$
$$= 1 + 1 - 2 \tag{7}$$
$$= 0 \tag{8}$$

Thus ,the equation of circle is obtained as

$$\|\mathbf{x}\|^2 + 2 \begin{pmatrix} -1 & -1 \end{pmatrix} \mathbf{x} = 0 \tag{9}$$

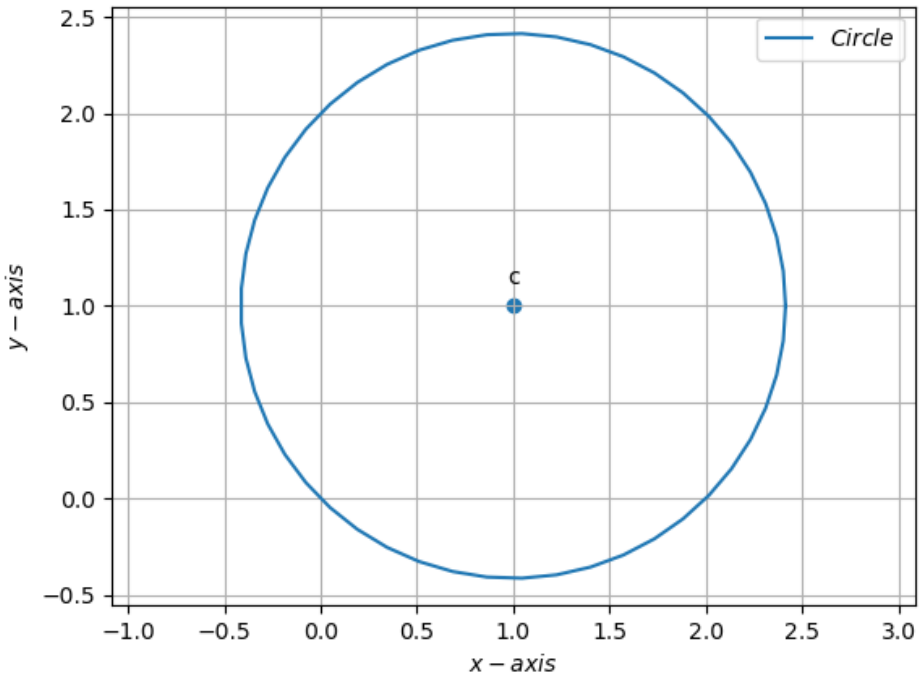

Figure 1: