

CHAPTER-11  
CIRCLES

### Exercise 11.1

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

**Solution:** Given

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

We know the equation of the circle is given as

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

So, here

$$\mathbf{u} = \begin{pmatrix} \frac{1}{2} \\ \frac{1}{2} \end{pmatrix} \quad (3)$$

$$f = \|\mathbf{u}\|^2 - r^2 \quad (4)$$

$$= \begin{pmatrix} \frac{1}{2} & \frac{1}{2} \end{pmatrix} \begin{pmatrix} \frac{1}{2} \\ \frac{1}{2} \end{pmatrix} - 2 \quad (5)$$

$$= 2 - 2 = 0 \quad (6)$$

Thus, the equation of circle is obtained as

$$\|\mathbf{x}\|^2 + 2 \begin{pmatrix} \frac{1}{2} & \frac{1}{2} \end{pmatrix} \mathbf{x} = 0 \quad (7)$$

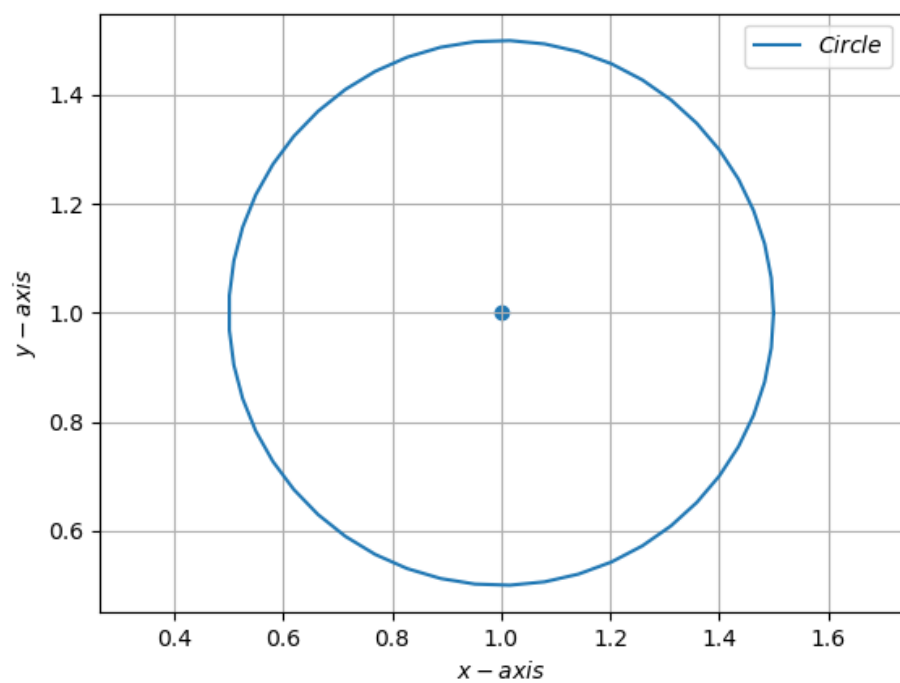


Figure 1: