CHAPTER 7 - COORDINATE GEOMETRY

Excercise 7.2

Q7.Find the coordinates of point A, where AB is the diameter of a circle where the center is (2,-3) and B is the point (1,4):
Solution:

1. The coordinates $\mathbf{B}$ and center $\mathbf{C}$ are given, where:

$$\mathbf{B} = \begin{pmatrix} 1 \\ 4 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}, \tag{1}$$

Let us assume the coordinates of $\mathbf{A}$. Now, $\mathbf{C}$ is the center which is midpoint of line AB and $\mathbf{B}$ is one of the coordinate of diameter AB of a circle.

Hence,

$$\mathbf{C} = \frac{\mathbf{A} + \mathbf{B}}{2} \tag{2}$$
$$2\mathbf{C} = \mathbf{A} + \mathbf{B} \tag{3}$$
$$\mathbf{A} = 2\mathbf{C} - \mathbf{B} \tag{4}$$
$$= 2\begin{pmatrix} 2 \\ -3 \end{pmatrix} - \begin{pmatrix} 1 \\ 4 \end{pmatrix} \tag{5}$$
$$= \begin{pmatrix} 4 \\ -6 \end{pmatrix} - \begin{pmatrix} 1 \\ 4 \end{pmatrix} \tag{6}$$
$$= \begin{pmatrix} 4-1 \\ -6-4 \end{pmatrix} \tag{7}$$
$$= \begin{pmatrix} 3 \\ -10 \end{pmatrix} \tag{8}$$

Therefore,the coordinates of $\mathbf{A}$ for value for given point $\mathbf{B}(1, 4)$ and center $\mathbf{C}(2, -3)$ given by $\mathbf{A}(3, -10)$.

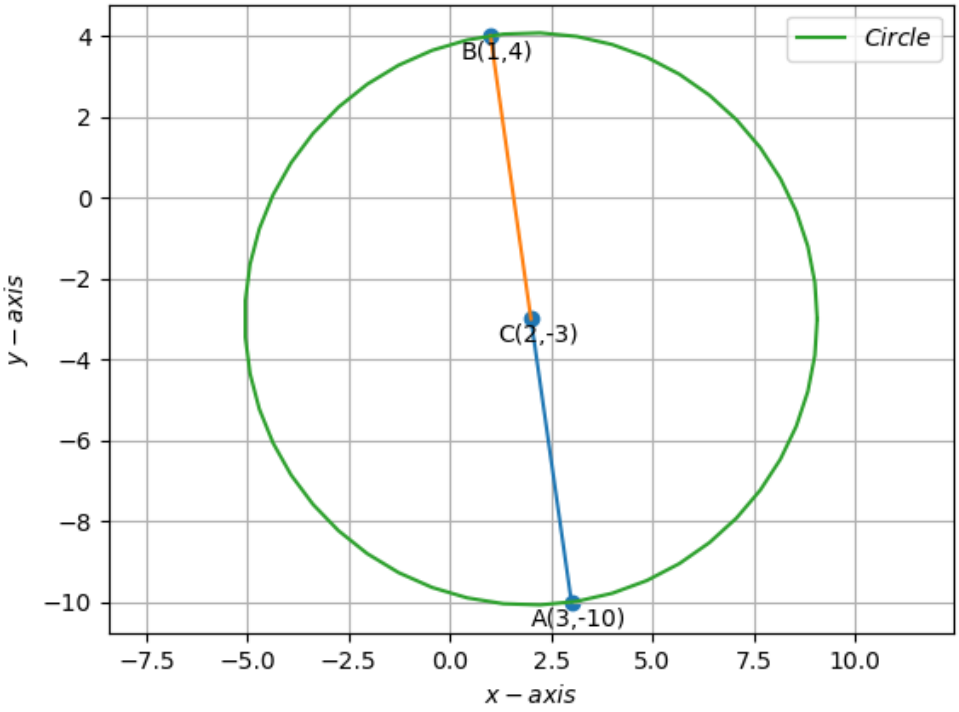

Figure 1: Circle for the given coordinates