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):

1. $B\left(1,4\right), C\left(-2,3\right)$

Solution:

1. The coordinates are given as

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

In a straight line AB, whose coordinates are B and C are given. Let us assume the coordinates of A. Now, C is the center which is midpoint of line AB, which is given in the start as $\mathbf{C}(\mathbf{2},\mathbf{-3})$ and we have $\mathbf{B}(\mathbf{1},\mathbf{4})$.

Hence,

$$\mathbf{C} = \frac{1}{2}(\mathbf{A}+\mathbf{B}) \tag{2}$$

$$\begin{pmatrix}2\\-3\end{pmatrix} = \frac{\mathbf{A}+\mathbf{B}}{2} \tag{3}$$

$$\begin{pmatrix}2\\-3\end{pmatrix} = \frac{1}{2}\left(\left(A\right)+\begin{pmatrix}1\\4\end{pmatrix}\right) \tag{4}$$

$$\begin{pmatrix}2\\-3\end{pmatrix} = \frac{1}{2}\begin{pmatrix}A+1\\A+4\end{pmatrix} \tag{5}$$

$$\begin{pmatrix}2\\-3\end{pmatrix} = \begin{pmatrix}(A+1)/2\\(A+4)/2\end{pmatrix} \tag{6}$$

From equation (5) we need to find the values of which are the coordinates of A. Thus,

$$(A+1)/2 = 2 \tag{7}$$

$$\implies ((A+1)) = 4 \tag{8}$$

$$\implies (A) = (3) \tag{9}$$

Similarly,

$$(A+4)/2 = -3 \tag{10}$$
$$\implies ((A+4)) = -6 \tag{11}$$
$$\implies (A) = (-10) \tag{12}$$

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

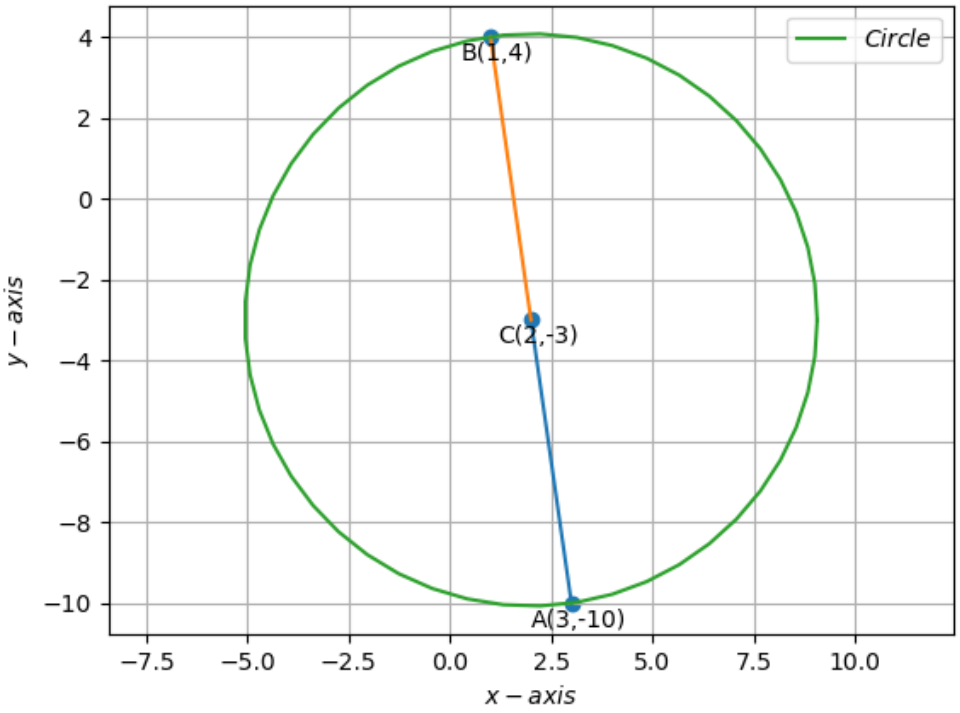

Figure 1: Circle for the given coordinates