

CHAPTER-7
COORDINATE GEOMETRY

Exercise 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. $B(1,4), C(-2,3)$

Solution:

1. The coordinates are given as

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

In a straight line AB, whose coordinates are A(x₁,y₁) and B(x₂,y₂). The mid-point of AB is C(x,y).

Let us assume the coordinate of A as (x,y). Now, as the center is the midpoint of AB, which is given in the start as (2, -3) and we have B as (1,4).

Hence,

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

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

$$\begin{pmatrix} 2 \\ -3 \end{pmatrix} = \frac{1}{2} \left(\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 1 \\ 4 \end{pmatrix} \right) \quad (4)$$

$$\begin{pmatrix} 2 \\ -3 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} x+1 \\ y+4 \end{pmatrix} \quad (5)$$

$$\begin{pmatrix} 2 \\ -3 \end{pmatrix} = \begin{pmatrix} (x+1)/2 \\ (y+4)/2 \end{pmatrix} \quad (6)$$

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

$$(x + 1)/2 = 2 \quad (7)$$

$$\implies ((x + 1)) = 4 \quad (8)$$

$$\implies (x) = (3) \quad (9)$$

$$(10)$$

Similarly,

$$(y + 4)/2 = -3 \quad (11)$$

$$\implies ((y + 4)) = -6 \quad (12)$$

$$\implies (y) = (-10) \quad (13)$$

$$(14)$$

Hence, therefore value of x and y for given point **B(1, 4)** and center **C(-2, 3)** is 3 and -10 respectively. So the coordinates of A is given by **A(3, -10)**.

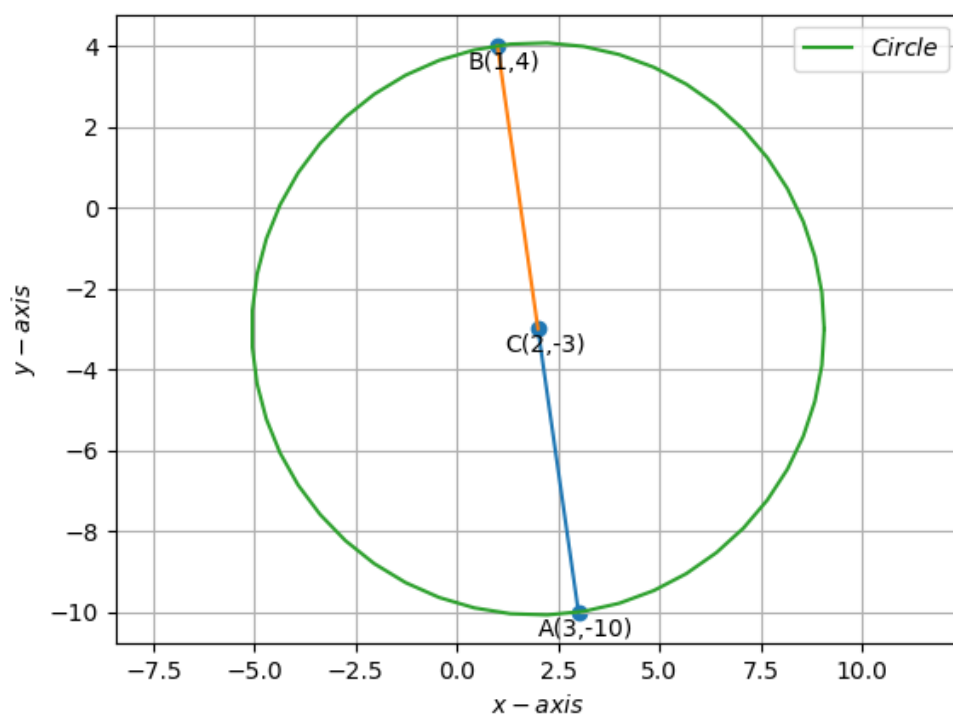


Figure 1: Circle for the given coordinates