

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(x<sub>1</sub>,y<sub>1</sub>) and B(x<sub>2</sub>,y<sub>2</sub>). 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,  $C = \frac{1}{2}(A + B)$

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

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

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

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

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

$$\begin{aligned} (x + 1)/2 &= 2 \\ \implies (x + 1) &= 4 \\ \implies (x) &= (3) \end{aligned} \quad (6)$$

Similarly,

$$\begin{aligned}
 (y + 4)/2 &= -3 \\
 \implies ((y + 4)) &= -6 \\
 \implies (y) &= (-10)
 \end{aligned}
 \tag{7}$$

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(x,y) = A(3,-10).

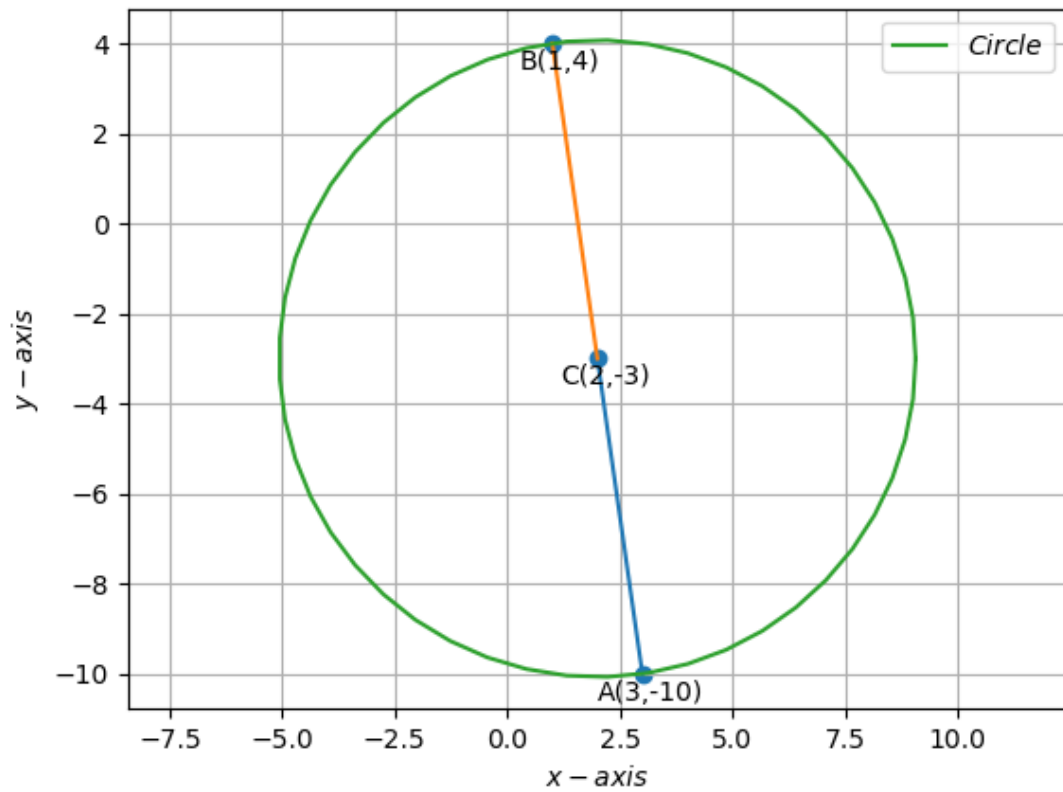


Figure 1: Circle for the given coordinates