

## 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 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  $\mathbf{C}(2, -3)$  and we have  $\mathbf{B}(1, 4)$ .

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 which are the coordinates of A. Thus,

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

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

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

Similarly,

$$(y + 4)/2 = -3 \quad (10)$$

$$\implies ((y + 4)) = -6 \quad (11)$$

$$\implies (y) = (-10) \quad (12)$$

Hence, therefore value 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)**.

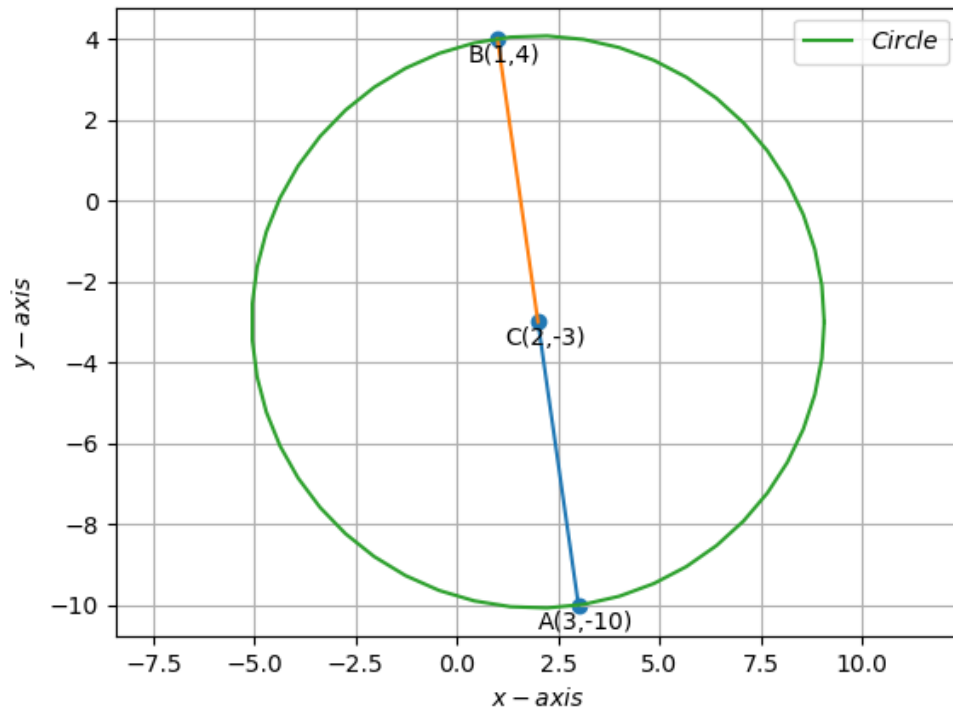


Figure 1: Circle for the given coordinates