Solution for Question 1.5.16

AI24BTECH11035-Preethika

1) Find the coordinates of a point A where AB is a diameter of the circle with center (3, -1) and the point B is (2, 6).

Variable	Value
Center of Circle	$(3,-1)$
Point B	$(2,6)$
Coordinates of Point A	(x,y)

TABLE I
VARIABLES USED

Solution: Given,
Center of the circle C = (3, -1), and point B = (2, 6).
Let the coordinates of point A be (x, y). Since AB is the diameter of the circle, the center is the midpoint of A and B.

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

$$= \frac{(x,y)+(2,6)}{2} \tag{2}$$

$$= \left(\frac{x+2}{2}, \frac{y+6}{2}\right). \tag{3}$$

Given the centre of the circle C is (3,-1),we can write

$$\left(\frac{x+2}{2}, \frac{y+6}{2}\right) = (3,-1) \tag{4}$$

This gives two equations:

$$\frac{x+2}{2} = 3 \quad \Rightarrow \quad x+2=6 \quad \Rightarrow \quad x=4 \tag{5}$$

$$\frac{y+6}{2} = -1 \quad \Rightarrow \quad y+6=-2 \quad \Rightarrow \quad y=-8 \tag{6}$$

Therefore, the coordinates of point A are (4, -8).

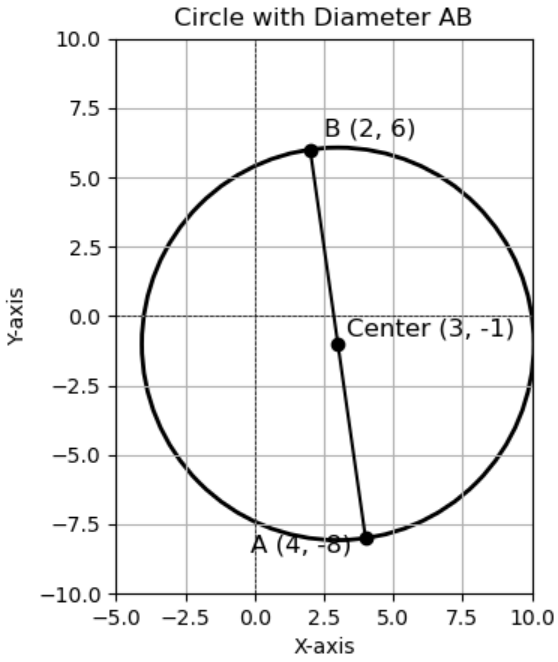

Fig. 1. Graph of the Circle with Diameter AB