

# 1.5.16

EE25btech11028 - J.Navya sri

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

**Solution:** let  $C$  be the center of circle

Point	Vector
B	$\begin{pmatrix} 2 \\ 6 \end{pmatrix}$
C	$\begin{pmatrix} 3 \\ -1 \end{pmatrix}$

Given points:

$$A(x, y)$$

$$B(2, 6)$$

$$C(3, -1)$$

As  $C$  is the center of the circle, it divides  $AB$  in  $1 : 1$  ratio. If  $P$  divides  $QR$  in  $k : 1$  ratio, then

$$P = \frac{kR + 1(Q)}{k + 1}$$

Now,

$$C = \left( \frac{A+B}{2} \right)$$

$$2 \begin{pmatrix} 3 \\ -1 \end{pmatrix} = \begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 2 \\ 6 \end{pmatrix}$$

$$\begin{pmatrix} 6 \\ -2 \end{pmatrix} = \begin{pmatrix} x+2 \\ y+6 \end{pmatrix}$$

$$x + 2 = 6 \Rightarrow x = 4$$

$$y + 6 = -2 \Rightarrow y = -8$$

Hence,

$$(x, y) = (4, -8)$$

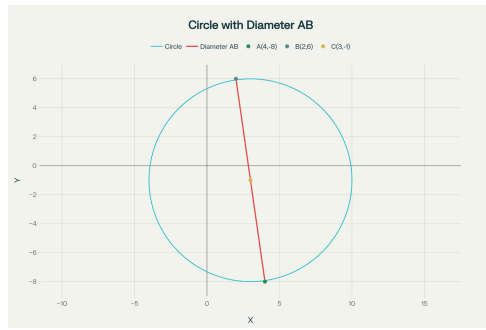


Fig. 0.1: Caption