

1.5.16

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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,

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



`figs/fig.png`

Fig. 0.1: Caption