1.5.20

EE25BTECH11032 - Kartik Lahoti

Question:

Find the coordinates of a point A where AB is the diameter of the circle with center $(-2, 2)$ and B is the point $(3, 4)$.

Solution:

Theory : Center of a circle is the mid-point of the diameter.

Let P be the center of the given circle , with AB as the diameter.

Let Point A have the coordinates $\begin{pmatrix} x \\ y \end{pmatrix}$

Given : $B \equiv \begin{pmatrix} 3 \\ 4 \end{pmatrix}, P \equiv \begin{pmatrix} -2 \\ 2 \end{pmatrix}$

If **P** is the mid point of **AB**

$$\mathbf{P} = \frac{\mathbf{A} + \mathbf{B}}{2} \tag{0.1}$$

Substituting the given vectors , we get :

$$\begin{pmatrix} -2 \\ 2 \end{pmatrix} = \frac{\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix}}{2} \tag{0.2}$$

$$\begin{pmatrix} -2 \\ 2 \end{pmatrix} = \frac{\begin{pmatrix} x+3 \\ y+4 \end{pmatrix}}{2} \tag{0.3}$$

$$2\begin{pmatrix} -2 \\ 2 \end{pmatrix} = \begin{pmatrix} x+3 \\ y+4 \end{pmatrix} \tag{0.4}$$

$$\begin{pmatrix} -4 \\ 4 \end{pmatrix} = \begin{pmatrix} x+3 \\ y+4 \end{pmatrix} \tag{0.5}$$

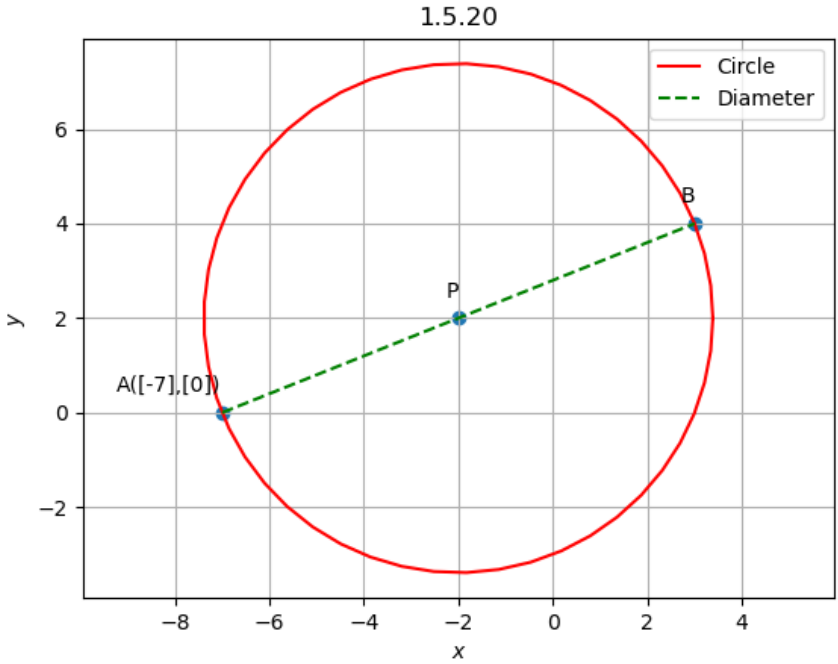
On comparing , we get :

$$-4 = x + 3 \implies x = -7 \tag{0.6}$$

$$4 = y + 4 \implies y = 0 \tag{0.7}$$

$$\therefore A \equiv \begin{pmatrix} -7 \\ 0 \end{pmatrix}$$

Hence , Coordinates of A are $(-7, 0)$



Circle With Centre P