1.5.18

EE25BTECH11030 - Josyula G S Avaneesh

Question:

Find the coordinates of a point A where AB is the diameter of the circle whose center is $\begin{pmatrix}2\\-3\end{pmatrix}$ and B is the point $\begin{pmatrix}1\\4\end{pmatrix}$.

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 **A** be the coordinates required to be found.

Given : $B \equiv \begin{pmatrix}1\\4\end{pmatrix}, P \equiv \begin{pmatrix}2\\-3\end{pmatrix}$

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

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

$$\mathbf{A} = 2\mathbf{P} - \mathbf{B} \tag{0.2}$$

Substituting the given vectors , we get :

$$\mathbf{A} = 2\begin{pmatrix}2\\-3\end{pmatrix} - \begin{pmatrix}1\\4\end{pmatrix} \tag{0.3}$$

$$\mathbf{A} = \begin{pmatrix}4-1\\-6-4\end{pmatrix} \tag{0.4}$$

$$\therefore A \equiv \begin{pmatrix}3\\-10\end{pmatrix}$$

Hence , Coordinates of A are $\begin{pmatrix}3\\-10\end{pmatrix}$

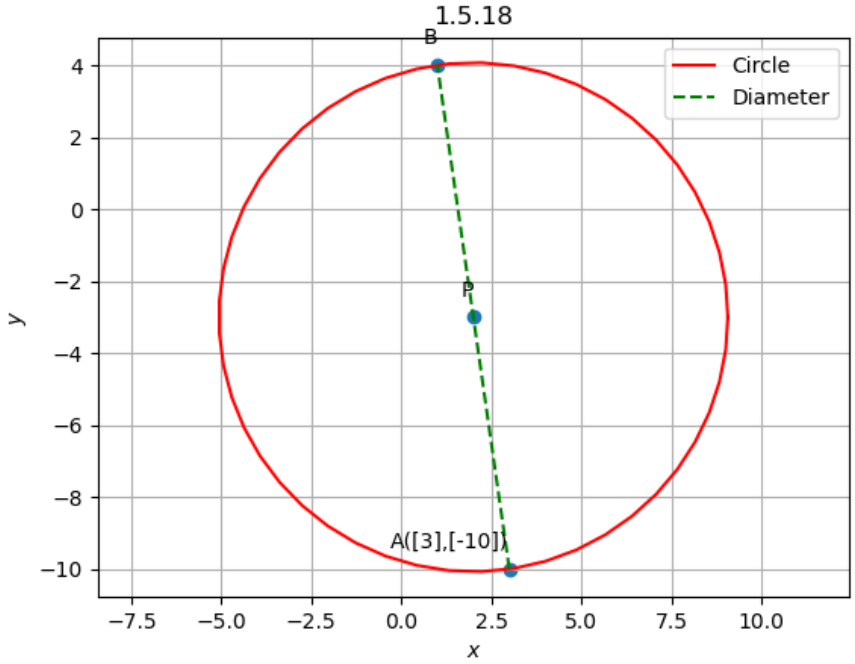

Fig. 0.1: Circle With Centre P