1-1.5-20

EE24BTECH11022 - Eshan Sharma

Question:
Find the coordinates of a point **A** where AB is a diameter of the circle with centre $(-2, 2)$ and **B** is the point $(3, 4)$

Solution:
Let the point **A** be (x, y).
Since AB is the diameter with centre of circle being $(-2, 2)$,
Centre of circle = $\frac{\mathbf{A}+\mathbf{B}}{2}$

$$\begin{pmatrix} -2 \\ 2 \end{pmatrix} = \frac{1}{2}\left(\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix}\right) \tag{0.1}$$

$$\begin{pmatrix} -2 \\ 2 \end{pmatrix} = \frac{1}{2}\left(\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix}\right) \tag{0.2}$$

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

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

$$-4 = x + 3 \tag{0.5}$$

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

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

$$y = 4 - 4 = 0 \tag{0.8}$$

Therefore, the coordinates of point **A** are $\boxed{(-7, 0)}$.

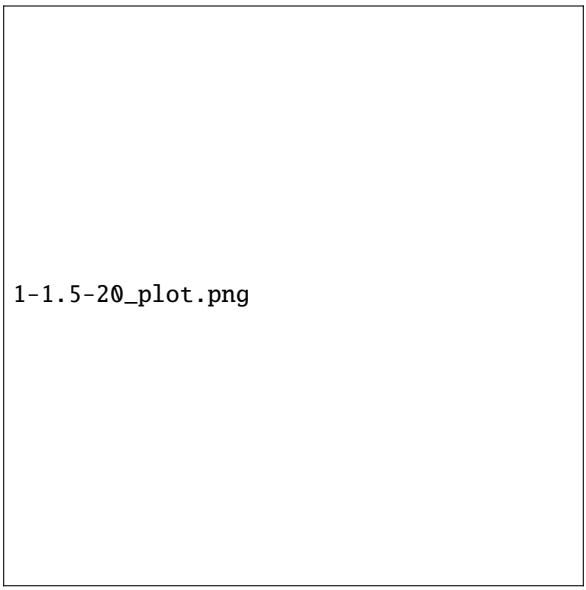

Fig. 0.1: Circle with Diameter AB and Center $O(-2, 2)$