Question-1-1.5-17

EE24BTECH11038 - MALAKALA BALA SUBRAHMANYA ARAVIND

Question:
The midpoint of line segment joining $\mathbf{A}\,(2a, 4)$ and$\mathbf{B}\,(-2, 3b)$ is $\mathbf{C}\,(1, 2a+1)$. Find the values of a and b.
Solution:

Point	Coordinates
A	$(2a, 4)$
B	$(-2, 3b)$
C	$(1, 2a+1)$

TABLE 0: variables used

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

Now substituting the values of **A**, **B** and **C**

$$\begin{pmatrix} 1 \\ 2a+1 \end{pmatrix} = \frac{\begin{pmatrix} 2a \\ 4 \end{pmatrix} + \begin{pmatrix} -2 \\ 3b \end{pmatrix}}{2} \tag{0.2}$$

$$\begin{pmatrix} 1 \\ 2a+1 \end{pmatrix} = \begin{pmatrix} a-1 \\ 4+\frac{3b}{2} \end{pmatrix} \tag{0.3}$$

$$a - 1 = 1 \tag{0.4}$$

$$\implies a = 2 \tag{0.5}$$

$$2a + 1 = a + \frac{3b}{2} \tag{0.6}$$

$$\implies b = 2 \tag{0.7}$$

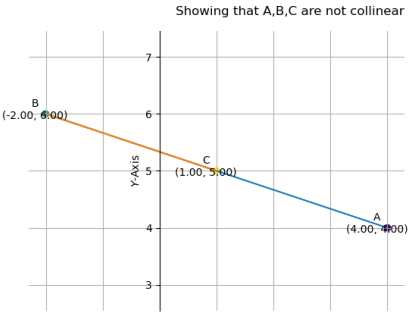

Fig. 0.1: Line **AB**