

Question-1-1.5-17

EE24BTECH11038 - MALAKALA BALA SUBRAHMANYA ARAVIND

Question:

The midpoint of line segment joining **A** $(2a, 4)$ and **B** $(-2, 3b)$ is $(1, 2a + 1)$. Find the values of a and b.

Solution:

Point	Coordinates
A	$(2a, 4)$
B	$(-2, 3b)$
mid point of A and B be C	$(1, 2a + 1)$

TABLE 0: variables used

$$\mathbf{C} = \frac{\mathbf{A} + \mathbf{B}}{2} \quad (0.1)$$

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

$$\Rightarrow \begin{pmatrix} 1 \\ 2a+1 \end{pmatrix} = \frac{\begin{pmatrix} 2a \\ 4 \end{pmatrix} + \begin{pmatrix} -2 \\ 3b \end{pmatrix}}{2} \quad (0.2)$$

$$\Rightarrow \begin{pmatrix} 1 \\ 2a+1 \end{pmatrix} = \begin{pmatrix} a-1 \\ 4 + \frac{3b}{2} \end{pmatrix} \quad (0.3)$$

$$\Rightarrow a-1 = 1 \quad (0.4)$$

$$\Rightarrow a = 2 \quad (0.5)$$

$$\Rightarrow 2a+1 = a + \frac{3b}{2} \quad (0.6)$$

$$\Rightarrow 3 = \frac{3b}{2} \quad (0.7)$$

$$\Rightarrow b = 2 \quad (0.8)$$

$$(0.9)$$

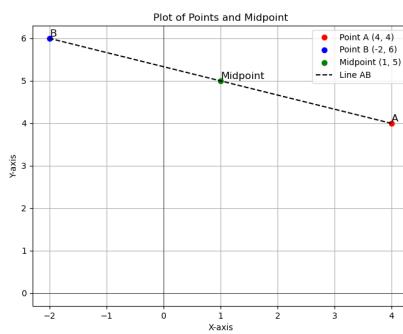


Fig. 0.1: stem plot of line **AB**