1.1.5.7

EE24BTECH11008 - Aslin Garvasis

Question: If $\mathbf{A}\left(\frac{a}{3},4\right)$ is the midpoint of the line segment joining the points $\mathbf{B}\left(-6,5\right)$ and $\mathbf{C}\left(-2,3\right)$, then the value of a is

solution:

Variable	Description	formula
$\mathbf{B}(-6,5)$	coordinates of first point	–
$\mathbf{C}(-2,3)$	coordinates of second point	–
$\mathbf{A}$	midpoint of $\mathbf{B}$ and $\mathbf{C}$	–
k	ratio in which $\mathbf{c}$ divides the line joining AB	$\frac{\mathbf{B}+k\mathbf{A}}{k+1}$

TABLE 0: Variables Used

$$\mathbf{A} = \frac{k\mathbf{C} + \mathbf{B}}{k+1} \tag{0.1}$$

where k is the ratio,here k=1

$$\mathbf{A} = \frac{\mathbf{B} + \mathbf{C}}{2} \tag{0.2}$$

$$\implies \mathbf{A} = \frac{\begin{pmatrix}-6\\5\end{pmatrix} + \begin{pmatrix}-2\\3\end{pmatrix}}{2} = \frac{\begin{pmatrix}-8\\8\end{pmatrix}}{2} = \begin{pmatrix}-4\\4\end{pmatrix} \tag{0.3}$$

$$\because \mathbf{A} = \begin{pmatrix}\frac{a}{3}\\4\end{pmatrix} \tag{0.4}$$

$$\implies a = -4 \times 3 \tag{0.5}$$

$$a = -12 \tag{0.6}$$

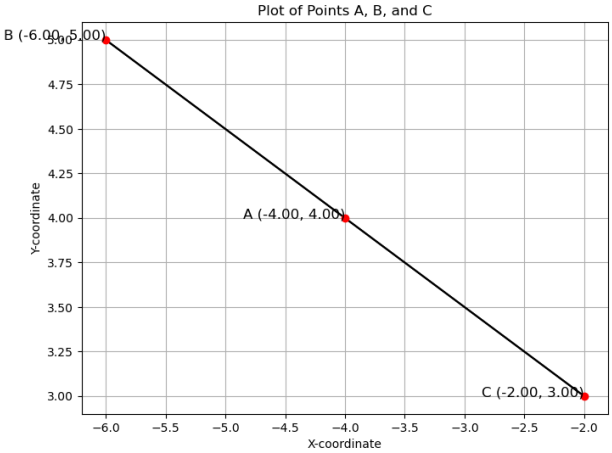

Fig. 0.1: Plot of points **A**, **B** and **C**