

1.1.5.33

EE24BTECH11047 - Niketh Prakash Achanta

Question:

Find the ratio in which the Y axis divides the line segment joining the points $(5, -6)$ and $(-1, -4)$. Also find the coordinates of the point of intersection. (10, 2012)

Solution:

Variable	Description	Formula
A	It is one end of the line segment	$A = \begin{pmatrix} 5 \\ -6 \end{pmatrix}$
B	It is other end of line segment	$B = \begin{pmatrix} -1 \\ -4 \end{pmatrix}$
C	It is the point of intersection of line segment and Y -axis	$C = \begin{pmatrix} 0 \\ y \end{pmatrix}$
k	It is the ratio in which C divides the line segment AB	$C = \left(\frac{B+kA}{1+k} \right)$

TABLE 0

Using the section formula:

$$C = \left(\frac{B + kA}{1 + k} \right) \quad (0.1)$$

$$C = \begin{pmatrix} 0 \\ y \end{pmatrix} \quad (0.2)$$

Also,

$$C = \left(\frac{\begin{pmatrix} 5k-1 \\ k+1 \end{pmatrix}}{1+k} \right) \quad (0.3)$$

Solving for k using x Coordinate of C

$$\left(\frac{5k-1}{k+1} \right) = 0 \quad (0.4)$$

$$k = \frac{1}{5} = 0.2 \quad (0.5)$$

Finding y Coordinate of C using k ,

$$y = \left(\frac{-6k-4}{k+1} \right) \quad (0.6)$$

$$y = \left(\frac{-1.2 - 4}{0.2 + 1} \right) \quad (0.7)$$

$$y = -4.3334 \quad (0.8)$$

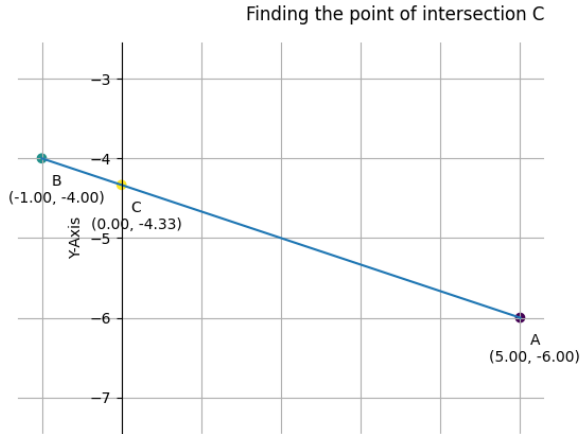


Fig. 0.1