1.1.5.33

EE24BTECH11059 - Yellanki Siddhanth

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:

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

$$C = \begin{pmatrix} 0 \\ y \end{pmatrix} \tag{0.2}$$

Also,

$$C = \begin{pmatrix} \frac{5k-1}{k+1} \\ \frac{-6k-4}{1+k} \end{pmatrix} \tag{0.3}$$

Solving for k using x Coordinate of C

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

$$k = \frac{1}{5} = 0.2 \tag{0.5}$$

Finding y Coordinate of C using k,

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

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

$$y = -4.3334 \tag{0.8}$$

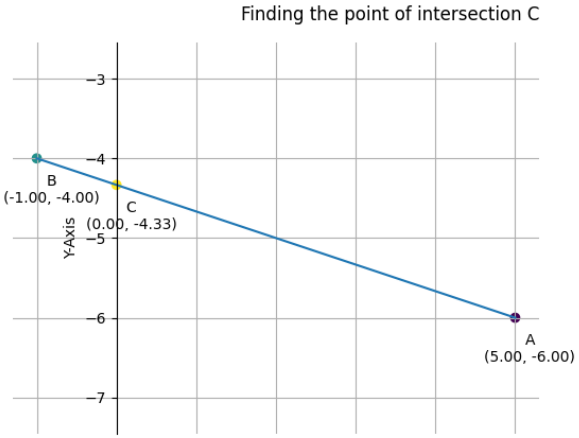

Fig. 0.1