1.5.13

EE25BTECH11025 - Ganachari Vishwambhar

Question:
Find the ratio in which the Y axis divides the line segment joining the points $\mathbf{A}\,(-1,-4)$ and $\mathbf{B}\,(5,-6)$. Also find the coordinates of the point of intersection.
Solution:

Variable	characteristic
C	point of intersection of the line segment and y-axis
x	x-coordinate of the point **C**
y	y-coordinate of point **C**
m	Slope of line segment joining **A** and **B**

Slope of line segment joining **A** and **B**:

$$m = \frac{(-6)-(-4)}{5-(-1)} \tag{0.1}$$

$$m = \left(\frac{-1}{3}\right) \tag{0.2}$$

Equation of the line joining the points **A** and **B** is

$$(Y-(-6)) = m\,(X-5) \tag{0.3}$$

$$X + 3Y = -13 \tag{0.4}$$

Equation of Y-axis is $X = 0$
The point of intersection of the given line segment and the Y-axis is:

$$\begin{pmatrix} 1 & 3 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -13 \\ 0 \end{pmatrix} \tag{0.5}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 0 \\ \left(\frac{-13}{3}\right) \end{pmatrix} \tag{0.6}$$

Hence the coordinates of **C** are $\left(0, \left(\frac{-13}{3}\right)\right)$
The ratio in which the Y-axis divides the given line segment is:

$$\frac{AC}{CB} = \frac{1}{5} \tag{0.7}$$

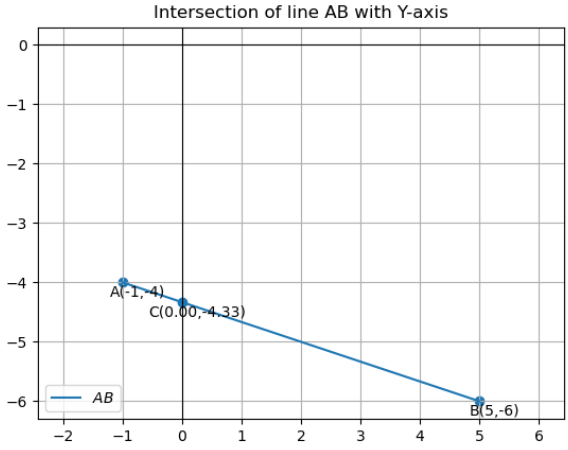

Fig. 0.1: Plot of line segment **AB**