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Assignment - Vector-2

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CONTENTS

I. PROBLEM

Find the ratio in which the line segment joining A(1, – 5) and B(– 4, 5) is divided by the x-axis. Also find the coordinates of the point of division.

II. SOLUTION

Let the x-axis divide the line segment at point (x,0) in the ratio k:1.

$$\mathbf{A} = \begin{pmatrix} 1 \\ -5 \end{pmatrix} \tag{1}$$

$$\mathbf{B} = \begin{pmatrix} -4 \\ 5 \end{pmatrix} \tag{2}$$

$$\mathbf{X} = \begin{pmatrix} x \\ 0 \end{pmatrix} \tag{3}$$

Using section formula,

$$\mathbf{X} = \frac{k\mathbf{B} + \mathbf{A}}{k+1} \tag{4}$$

$$\begin{pmatrix} x \\ 0 \end{pmatrix} = \frac{k\begin{pmatrix} -4 \\ 5 \end{pmatrix} + \begin{pmatrix} 1 \\ -5 \end{pmatrix}}{k+1} \tag{5}$$

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

$$\Rightarrow \frac{5k-5}{k+1} = 0 \tag{7}$$

$$\Rightarrow 5k = 5 \tag{8}$$

$$\Rightarrow k = 1 \tag{9}$$

Find the coordinates of the point of division

$$\begin{pmatrix} x \\ 0 \end{pmatrix} = \frac{\mathbf{B} + \mathbf{A}}{2} \tag{10}$$

$$= \begin{pmatrix} -\frac{3}{2} \\ 0 \end{pmatrix} \tag{11}$$

III. CODE LINK

https://github.com/sssurajit/fwc/blob/main/vectors/10.7.2.5/codes/vector.py

Execute the code by using the command
python3 vector.py

IV. FIGURE

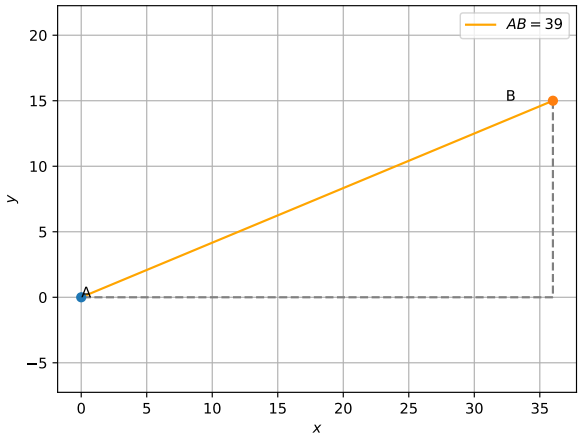

Fig. 1