

1-1.4-9c

EE24BTECH11009 - Mokshith Kumar Reddy

Question:

In what ratio does the point $\begin{pmatrix} -4 \\ 6 \end{pmatrix}$ divide the line segment joining the points $A\begin{pmatrix} -6 \\ 0 \end{pmatrix}$ and $B\begin{pmatrix} 3 \\ -8 \end{pmatrix}$?

Solution:

Vectors	Description
A	$\begin{pmatrix} -6 \\ 0 \end{pmatrix}$
B	$\begin{pmatrix} 3 \\ -8 \end{pmatrix}$
C	$\begin{pmatrix} -4 \\ 6 \end{pmatrix}$

TABLE 0: Vectors Used

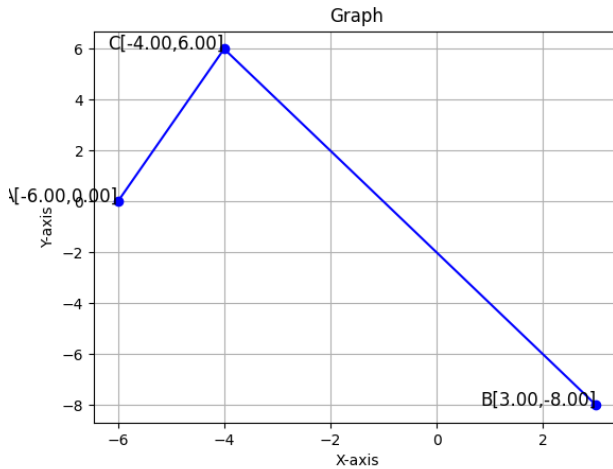


Fig. 0.1: Stem Plot of $y(n)$

from Fig. 0.1 we can see that the give point doesn't lie on the line segment joining A and B.

using section formulae:

Let the given point divides the line segment AB in a ratio k:1.

$$C = \frac{A + kB}{1 + k} \quad (0.1)$$

$$\Rightarrow k = \frac{(B - C)^T(C - A)}{\|B - C\|^2} \quad (0.2)$$

$$k = \frac{\begin{pmatrix} 7 & -14 \end{pmatrix} \begin{pmatrix} 2 \\ 6 \end{pmatrix}}{49 + 196} \quad (0.3)$$

$$k = \frac{-2}{7} \quad (0.4)$$

$$(0.5)$$