1-1.4-9c

EE24BTECH11009 - Mokshith Kumar Reddy

Question:
In what ratio does the point $(-4, 6)$ divide the line segment joining the points $\mathbf{A}(-6, 0)$ and $\mathbf{B}(3, -8)$?
Solution:

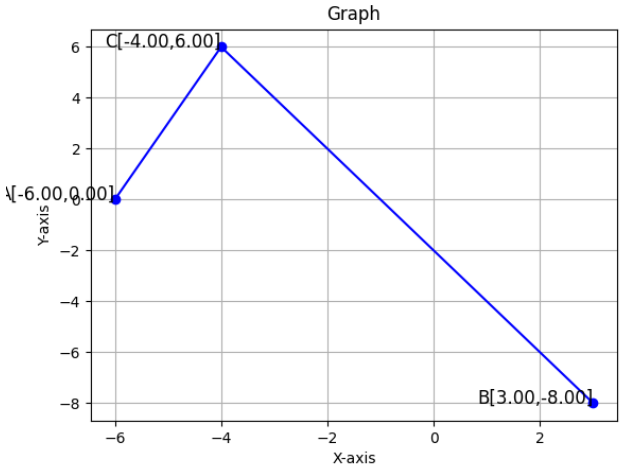

Fig. 0.1: Stem Plot of y(n)

Fig. **??** we can see that the given point doesn't lie on the line segment joining A and B.

$$d_1 = \|(A - C)\| \tag{0.1}$$
$$\implies (A - C)(A - C)^T \tag{0.2}$$
$$\implies \begin{pmatrix} -2 & -6 \end{pmatrix} \begin{pmatrix} -2 \\ -6 \end{pmatrix} \tag{0.3}$$
$$d_1 = \sqrt{2^2 + 6^2} = \sqrt{40} \tag{0.4}$$
$$\tag{0.5}$$

$$d_2 = \|(B - C)\| \tag{0.6}$$

$$\implies (B - C)(B - C)^T \tag{0.7}$$

$$\implies \begin{pmatrix} 7 & -14 \end{pmatrix} \begin{pmatrix} 7 \\ -14 \end{pmatrix} \tag{0.8}$$

$$d_2 = \sqrt{7^2 + 14^2} = 7\sqrt{5} \tag{0.9}$$

$$\therefore \frac{d_1}{d_2} = \frac{\sqrt{40}}{7\sqrt{5}} \tag{0.10}$$

Parameter	Description
A	$\begin{pmatrix} -6 \\ 0 \end{pmatrix}$
B	$\begin{pmatrix} 3 \\ -8 \end{pmatrix}$
C	$\begin{pmatrix} -4 \\ 6 \end{pmatrix}$
d_1	d_1=$\|\|(A - C)\|\|$
d_2	d_2=$\|\|(B - C)\|\|$

TABLE 0