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:

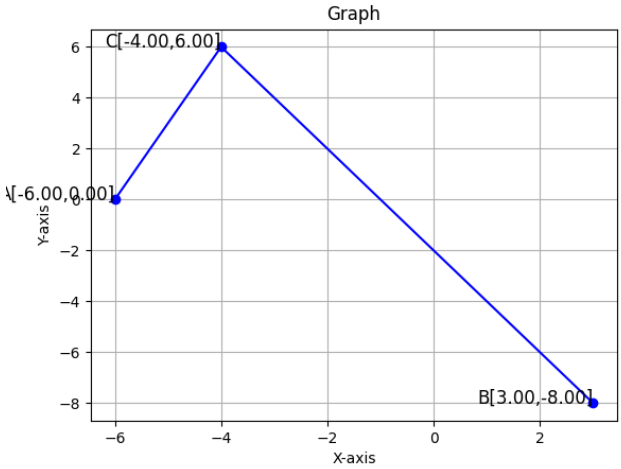

Fig. 0.1

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

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

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

$$\implies d_2^2 = (B-C)(B-C)^T \tag{0.7}$$

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

$$\implies d_2 = 7\sqrt{5} \tag{0.9}$$

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

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	$\|(A-C)\|$
d_2	$\|(B-C)\|$

TABLE 0