# 1-1.4-9c

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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:**

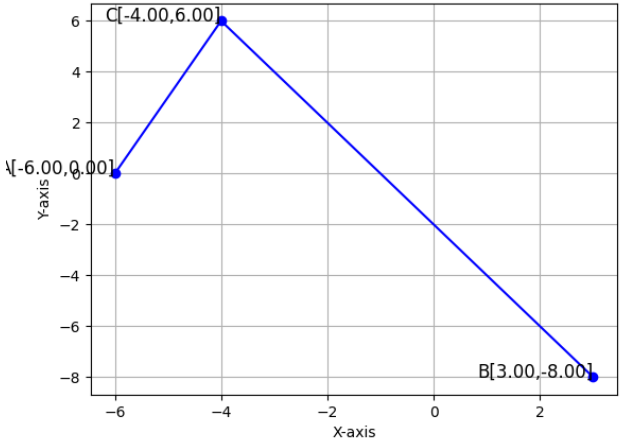


Fig. 0.1

Fig. 0.1 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: Parameter Table