matgeo: 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 $\mathbf{B}(3, -8)$? 1.4-9c

Plot

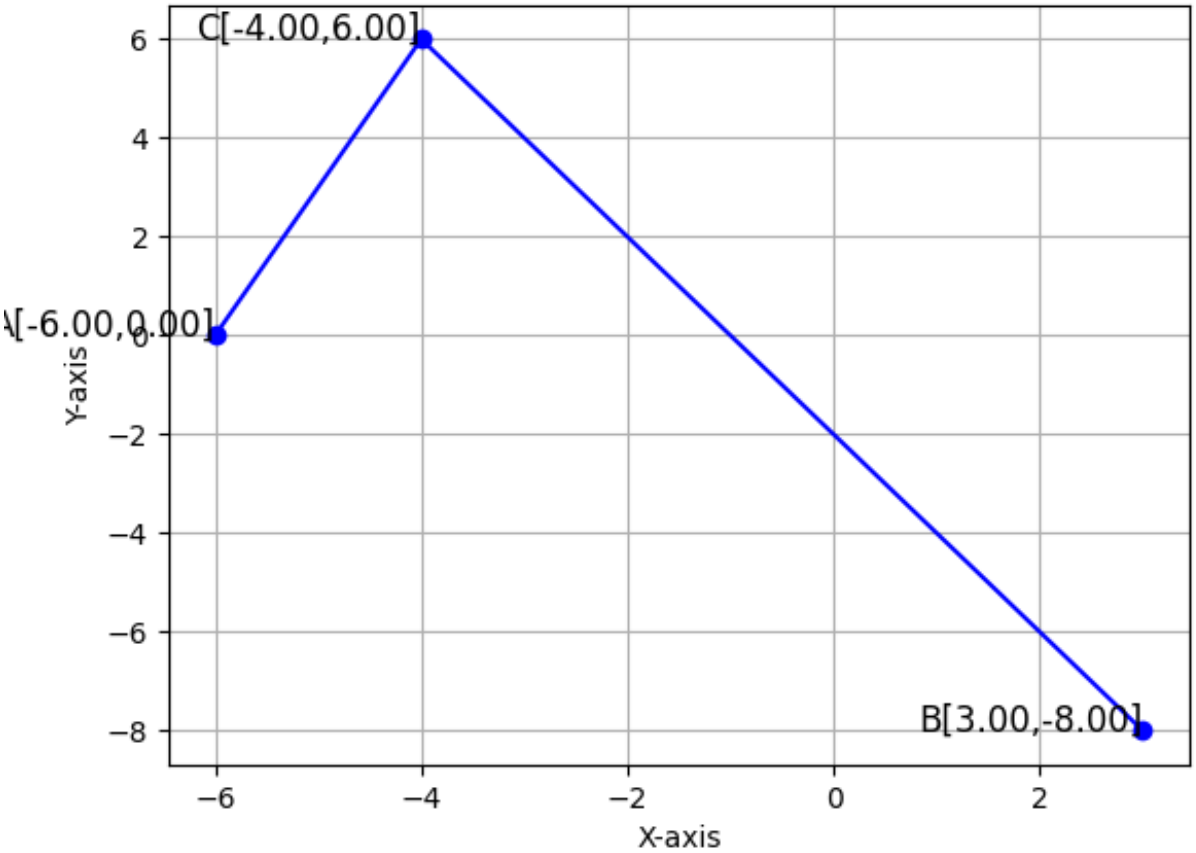

Figure:

Solution

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

$$d_1 = \|(A - C)\| \tag{1}$$
$$\implies d_1^2 = (A - C)(A - C)^T \tag{2}$$
$$= \begin{pmatrix} -2 & -6 \end{pmatrix} \begin{pmatrix} -2 \\ -6 \end{pmatrix} \tag{3}$$
$$\implies d_1 = \sqrt{40} \tag{4}$$
$$\tag{5}$$
$$d_2 = \|(B - C)\| \tag{6}$$
$$\implies d_2^2 = (B - C)(B - C)^T \tag{7}$$
$$= \begin{pmatrix} 7 & -14 \end{pmatrix} \begin{pmatrix} 7 \\ -14 \end{pmatrix} \tag{8}$$
$$\implies d_2 = 7\sqrt{5} \tag{9}$$

Table

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: Parameter Table