Coordinate Geometry

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10th Maths - Chapter 7

This is Problem-4 from Exercise 7.2

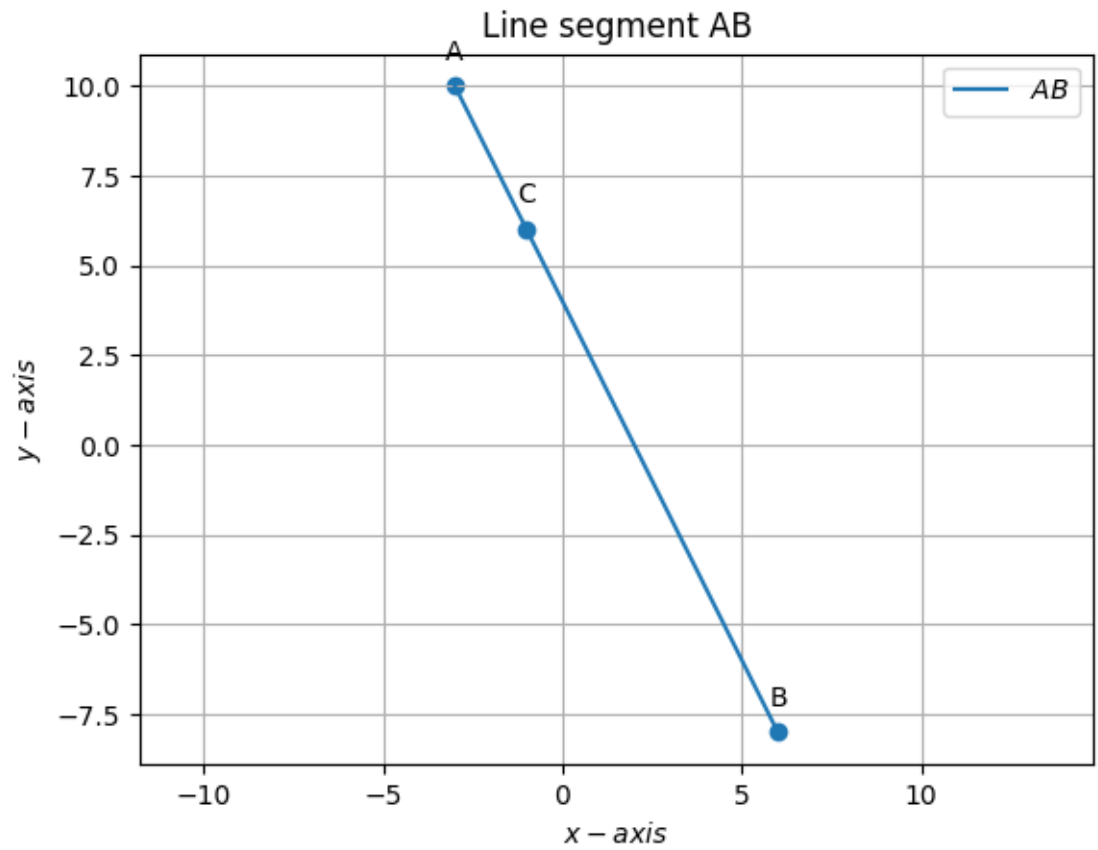1. Find the ratio in which the line segment joining the points (-3, 10) and $(6, -8)$ is divided by (-1, 6).
   Solution:
   Given Data:
   A $= \begin{pmatrix} -3 \\ 10 \end{pmatrix}$
   B $= \begin{pmatrix} 6 \\ -8 \end{pmatrix}$
   C $= \begin{pmatrix} -1 \\ 6 \end{pmatrix}$

Line segment AB

To find: ratio dividing them

Now,

$$C = \frac{A + nB}{n + 1} \tag{1}$$

$$C = \frac{1}{1 + n} \times \left(\begin{pmatrix} -3 \\ 10 \end{pmatrix} + n \times \begin{pmatrix} 6 \\ -8 \end{pmatrix} \right) \tag{2}$$

$$= \frac{1}{1 + n} \times \begin{pmatrix} -3 + 6n \\ 10 - 8n \end{pmatrix} \tag{3}$$

By taking x

$$-1 = \frac{-3 + 6n}{1 + n} \tag{4}$$

$$\implies -3 + 6n = -1 - n \tag{5}$$

$$\implies 6n + n = -1 + 3 \tag{6}$$

$$\implies 7n = 2 \tag{7}$$

$$\implies n = \frac{2}{7} \tag{8}$$

now, by taking y

$$6 = \frac{10 - 8n}{n + 1} \tag{9}$$

$$\implies 10 - 8n = 6 + 6n \tag{10}$$

$$\implies 10 - 6 = 6n + 8n \tag{11}$$

$$\implies 4 = 14n \tag{12}$$

$$\implies n = \frac{2}{7} \tag{13}$$

Therefore,the ratio which divides A and B is 2:7.