

Coordinate Geometry

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10th Maths - Chapter 7

This is Problem-9 from Exercise 7.2

1. Find the coordinates of the points which divide the line segment joining A (- 2, 2) and B (2, 8) into four equal parts.

Solution:

Given Data: A = $\begin{pmatrix} -2 \\ 2 \end{pmatrix}$

B = $\begin{pmatrix} 2 \\ 8 \end{pmatrix}$

To find: C, D, E = ?

let, k=1 Now,

$$C = \frac{A + kB}{k + 1} \quad (1)$$

$$C = \frac{\begin{pmatrix} -2 \\ 2 \end{pmatrix} + 1 \begin{pmatrix} 2 \\ 8 \end{pmatrix}}{(1 + 1)} \quad (2)$$

$$= \frac{\begin{pmatrix} -2 \\ 2 \end{pmatrix} + \begin{pmatrix} 2 \\ 8 \end{pmatrix}}{2} \quad (3)$$

$$= \frac{\begin{pmatrix} 0 \\ 10 \end{pmatrix}}{2} \quad (4)$$

$$= \begin{pmatrix} 0 \\ 5 \end{pmatrix} \quad (5)$$

$$C = (0, 5) \quad (6)$$

now,

$$D = \frac{A + kC}{k + 1} \quad (7)$$

$$D = \frac{\binom{-2}{2} + 1 \binom{0}{5}}{(1 + 1)} \quad (8)$$

$$= \frac{\binom{-2}{2} + \binom{0}{5}}{2} \quad (9)$$

$$= \frac{\binom{-2}{7}}{2} \quad (10)$$

$$= \binom{-1}{\frac{7}{2}} \quad (11)$$

$$D = (-1, \frac{7}{2}) \quad (12)$$

Similarly, the third point

$$E = \frac{C + kB}{k + 1} \quad (13)$$

$$E = \frac{\binom{0}{5} + 1 \binom{2}{8}}{(1 + 1)} \quad (14)$$

$$= \frac{\binom{0}{5} + \binom{2}{8}}{2} \quad (15)$$

$$= \frac{\binom{2}{13}}{2} \quad (16)$$

$$= \binom{2}{\frac{13}{2}} \quad (17)$$

$$E = (2, \frac{13}{2}) \quad (18)$$

therefore, the three points which divide AB into four equal parts are:

C = (0,5), D = (-1, $\frac{7}{2}$), E = (2, $\frac{13}{2}$)

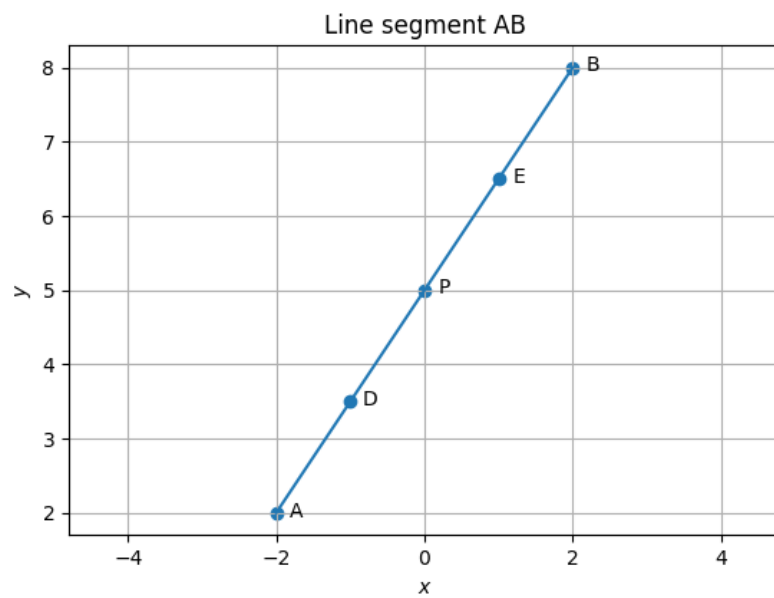


Figure 1: Line segment AB