# Linear equation in two variables

potnuru deekshitha (potnurudeekshitha@sriprakashschools.com)

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## $10^{th}$ Maths - Chapter 7

This is Problem-2 from Exercise 7.2

1. Find the coordinates of the point of trisection joining (4,-1),(-2,-3)

   **Solution:**
   Case-1
   $\mathbf{A}=\begin{pmatrix}4\\-1\end{pmatrix}$, $\mathbf{B}=\begin{pmatrix}-2\\-3\end{pmatrix}$, $m_1 : m_2 = 2 : 1$

$$P = \frac{m_1\mathbf{B} + m_2\mathbf{A}}{m_1 + m_2} \tag{1}$$

$$P = \frac{2\begin{pmatrix}-2\\-3\end{pmatrix} + 1\begin{pmatrix}4\\-1\end{pmatrix}}{2+1} \tag{2}$$

$$P = \frac{\begin{pmatrix}-4\\-6\end{pmatrix} + \begin{pmatrix}4\\-1\end{pmatrix}}{3} \tag{3}$$

$$P = \frac{\begin{pmatrix}0\\-7\end{pmatrix}}{3} \tag{4}$$

$$P = \begin{pmatrix}0\\\frac{-7}{3}\end{pmatrix} \tag{5}$$

$$\tag{6}$$

Case-2
$\mathbf{A}=\begin{pmatrix}4\\-1\end{pmatrix}$, $\mathbf{B}=\begin{pmatrix}-2\\-3\end{pmatrix}$, $m_1 : m_2 = 1 : 2$

$$P = \frac{m_1\mathbf{B} + m_2\mathbf{A}}{m_1 + m_2} \tag{7}$$

$$P = \frac{1\begin{pmatrix}-2\\-3\end{pmatrix} + 2\begin{pmatrix}4\\-1\end{pmatrix}}{2+1} \tag{8}$$

$$P = \frac{\begin{pmatrix}-2\\-3\end{pmatrix} + \begin{pmatrix}8\\-2\end{pmatrix}}{3} \tag{9}$$

$$P = \frac{\begin{pmatrix}6\\-5\end{pmatrix}}{3} \tag{10}$$

$$P = \begin{pmatrix}2\\\frac{-5}{3}\end{pmatrix} \tag{11}$$

$$\tag{12}$$

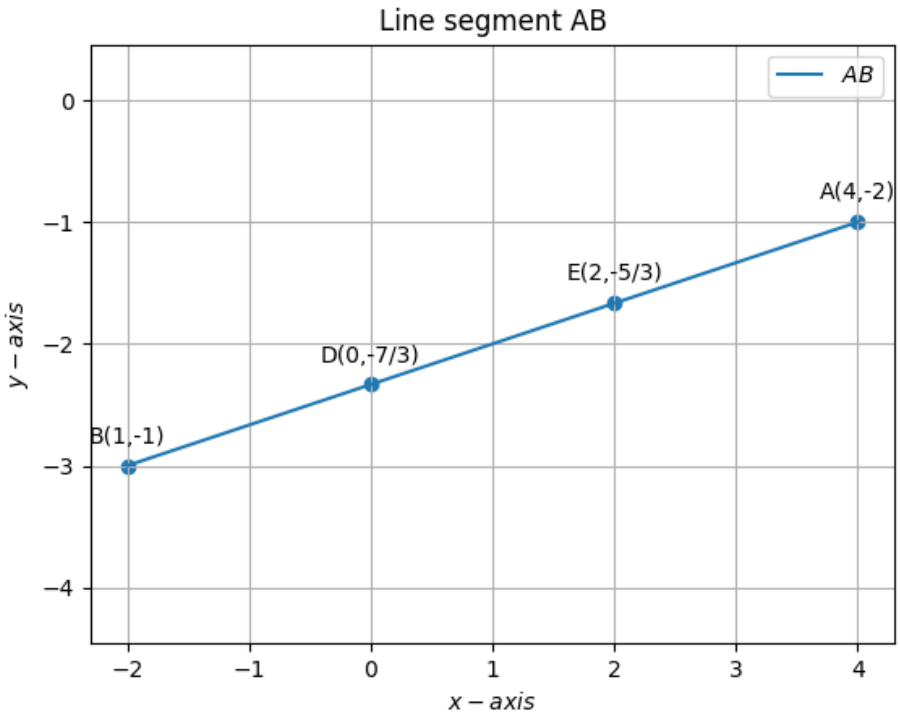


Figure 1: Line segment AB.