1.5.29

EE25BTECH11042 - Nipun Dasari

Question:
The coordinates of the point P dividing the line segment joining the points A (1, 3) and B (4, 6), in the ratio 2 : 1 are
Solution:
Let us solve the given equation theoretically and then verify the solution computationally
According to the question,
Consider the coordinate as following vectors

$$\mathbf{P} = \begin{pmatrix} x_1 \\ y_1 \end{pmatrix}$$

Given the points A and B

$$\mathbf{A} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 4 \\ 6 \end{pmatrix}$$

The formula for internal division of vectors is where P divides A and B in the ratio m:n

$$\mathbf{P} = \frac{m\mathbf{B} + n\mathbf{A}}{m+n}$$

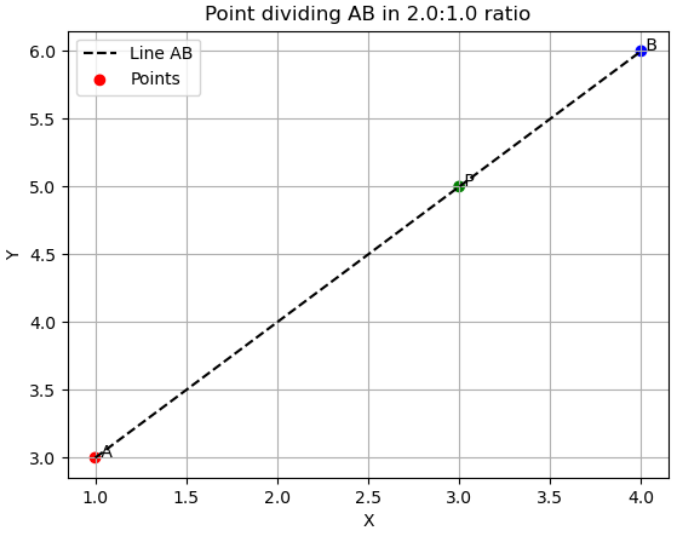
Thus by formula

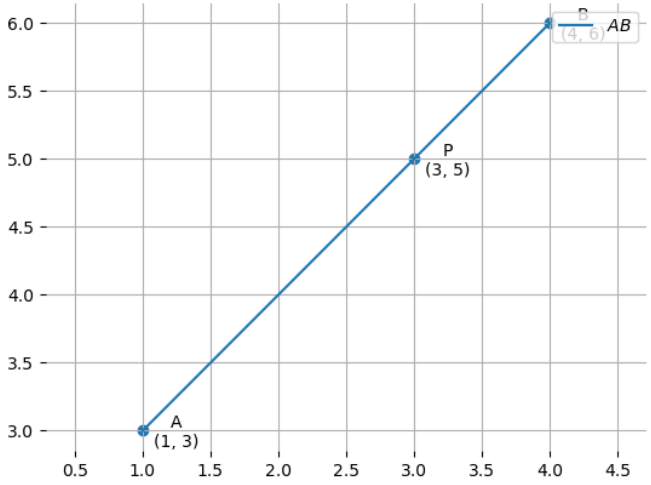
$$\mathbf{P} = \frac{1}{3}\left(\begin{pmatrix} 1 \\ 3 \end{pmatrix} + 2\begin{pmatrix} 4 \\ 6 \end{pmatrix}\right)$$

$$\mathbf{P} = \frac{1}{3}\left(\begin{pmatrix} 1 \\ 3 \end{pmatrix} + \begin{pmatrix} 8 \\ 12 \end{pmatrix}\right)$$

$$\mathbf{P} = \frac{1}{3}\begin{pmatrix} 9 \\ 15 \end{pmatrix}$$

$$\therefore \mathbf{P} = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$$


Point dividing AB in 2.0:1.0 ratio
Line AB
Points
A
P
B
X
Y
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3.0
4.0
4.5
5.0
5.5
6.0


AB
P
(3, 5)
A
(1, 3)
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0