1.1.5.14

EE24BTECH11018 - Durgi Swaraj Sharma

Question:
Points **P** and **Q** trisect the line segment joining the points **A** $(-2, 0)$ and **B** $(0, 8)$ such that **P** is nearer to **A**. Find the coordinates of points **P** and **Q**. (10, 2019)

Solution:

Point	Description	Coordinates
A	One end of the line segment	$A = \begin{pmatrix} -2 \\ 0 \end{pmatrix}$
B	Other end of line segment	$B = \begin{pmatrix} 0 \\ 8 \end{pmatrix}$
P	Point trisecting the line segment and closer to point **A**	$P = \begin{pmatrix} x_1 \\ y_1 \end{pmatrix}$
Q	The other point trisecting the line segment	$Q = \begin{pmatrix} x_2 \\ y_2 \end{pmatrix}$

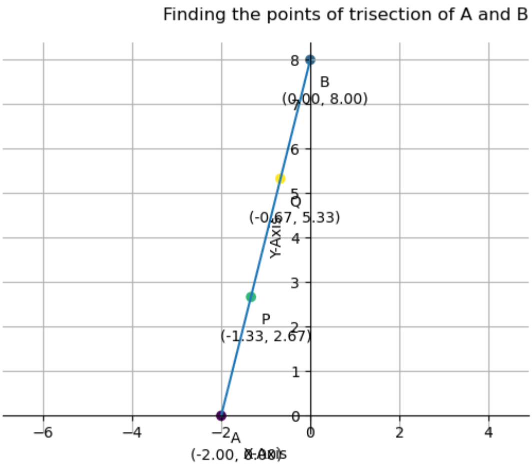
TABLE 0

Using the section formula:

$$\mathbf{P} = \frac{1}{1 + \frac{1}{2}} \left(\begin{pmatrix} -2 \\ 0 \end{pmatrix} + \frac{1}{2} \begin{pmatrix} 0 \\ 8 \end{pmatrix} \right) = \begin{pmatrix} \frac{-4}{3} \\ \frac{8}{3} \end{pmatrix} \tag{0.1}$$

$$\mathbf{Q} = \frac{1}{1 + \frac{1}{2}} \left(\begin{pmatrix} -2 \\ 0 \end{pmatrix} + \frac{2}{1} \begin{pmatrix} 0 \\ 8 \end{pmatrix} \right) = \begin{pmatrix} \frac{-2}{3} \\ \frac{16}{3} \end{pmatrix} \tag{0.2}$$

Thus, we have found the points of trisection to be $\mathbf{P} = \begin{pmatrix} \frac{-4}{3} \\ \frac{8}{3} \end{pmatrix}$ and $\mathbf{Q} = \begin{pmatrix} \frac{-2}{3} \\ \frac{16}{3} \end{pmatrix}$.



Finding the points of trisection of A and B
B
(0.00, 8.00)
Q
(-0.67, 5.33)
P
(-1.33, 2.67)
A
(-2.00, 0.00)
Y-Axis
X-Axis
−6
−4
−2
0
2
4
0
1
2
3
4
5
6
7
8

Fig. 0.1