Assignment-2

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$\mathbf{P}(5,-3)$ and $\mathbf{Q}(3,y)$ are the points of trisection of the line segment joining $\mathbf{A}(7,-2)$ and $\mathbf{B}(1,-5)$. Theny equals

Solution: Given $\mathbf{P}(5,-3)$, $\mathbf{A}(7,-2)$, $\mathbf{B}(1,-5)$ and $\mathbf{Q}(3,y)$

Also given that $\mathbf{P}and\mathbf{Q}$ are the points of tricection of AB.

Let $\mathbf{Q}$ divides the line segment AB in the ratio $k:1$. That implies $\mathbf{P}$ divides line segment AB in the ratio $1:k$.

$$\implies \mathbf{P} = \frac{k\mathbf{A}+\mathbf{B}}{k+1}$$

$$\implies \begin{pmatrix}5\\-3\end{pmatrix} = \frac{k\begin{pmatrix}7\\-2\end{pmatrix}+\begin{pmatrix}1\\-5\end{pmatrix}}{k+1}$$

lets solve x coordinate

$$\implies 5 = \frac{7k+1}{k+1}$$
$$\implies 5k+5 = 7k+1$$
$$\implies k = 2$$

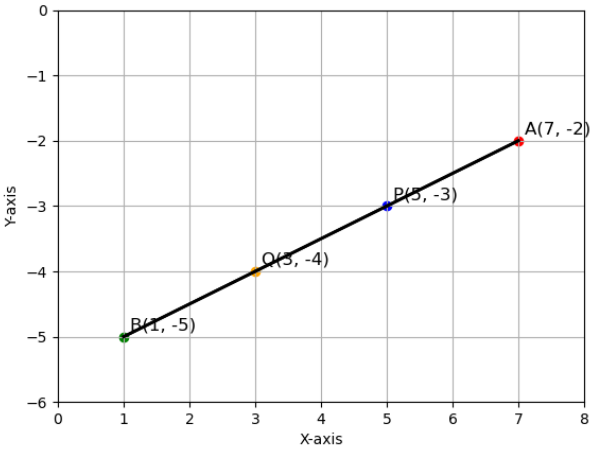
Therefore q divides AB in the ratio $2:1$

$$\implies \begin{pmatrix}3\\y\end{pmatrix} = \frac{\mathbf{B}+\frac{1}{2}\mathbf{A}}{1+\frac{1}{2}+1}$$

lets solve y coordinate of $\mathbf{Q}$

$$\implies y = \frac{(-5)+(-2)\frac{1}{2}}{\frac{3}{2}}$$
$$\implies y = \frac{-12}{3}$$

Therefore $y = -4$


A(7, -2)
P(5, -3)
Q(3, -4)
B(1, -5)
X-axis
Y-axis
0
1
2
3
4
5
6
7
8
−1
−2
−3
−4
−5
−6