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 $1:k$.

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

lets solve x coordinate

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

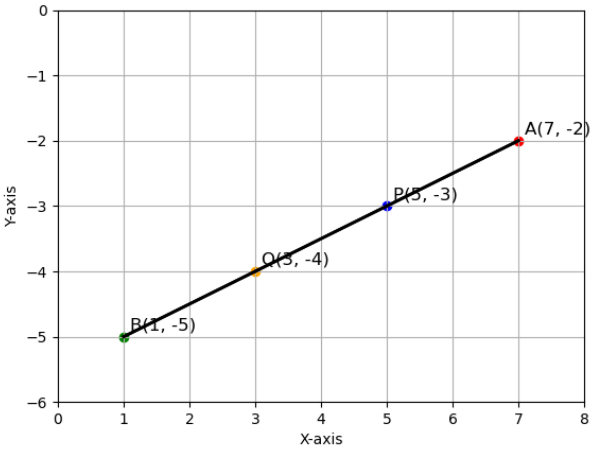
Therefore $\mathbf{Q}$ divides AB in the ratio $2:1$

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

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

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

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