Assignment-2 1-1.5-28

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Question: $\mathbf{P}(5,-3)$ 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 $1:k$.

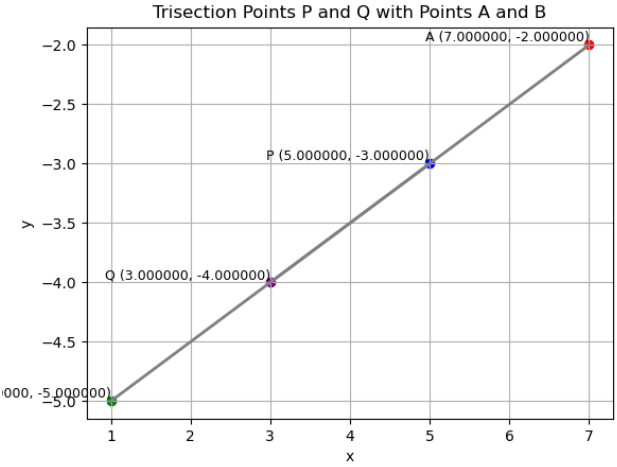
$$\mathbf{P} = \frac{k\mathbf{A} + \mathbf{B}}{k+1}$$

On solve x coordinate we get k=2 Therefore $\mathbf{Q}$ divides AB in the ratio $2:1$

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

$$y = -4.$$

Point	Description
P(5,-3)	This point divides A(7,-2) and B(1,-5) in the ratio 1:2
Q(3,-4)	This point divides A(7,-2) and B(1,-5) in the ratio 2:1


Trisection Points P and Q with Points A and B
A (7.000000, -2.000000)
P (5.000000, -3.000000)
Q (3.000000, -4.000000)
000, -5.000000)
−2.0
−2.5
−3.0
−3.5
−4.0
−4.5
−5.0
y
1
2
3
4
5
6
7
x