1.5.26

GNANTHIK LUCKY -EE25BTECH11038

August 23,2025

Let **P** and **Q** be the points of trisection of the line segment that join the points **A** (2,-2) and **B** (-7,4) such that **P** is closer to **A**. Find the coordinates of **P** and **Q**.

formula

D divides BC in the ratio $k : 1$,

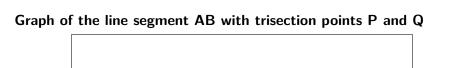$$\mathbf{D} = \frac{k\mathbf{C} + \mathbf{B}}{k + 1}$$

$$\text{Let } A = \begin{pmatrix} 2 \\ -2 \end{pmatrix}, \qquad B = \begin{pmatrix} -7 \\ 4 \end{pmatrix}$$

Point P (Nearer to A, Ratio 1 : 2):

$$P = \frac{1}{3}B + \frac{2}{3}A = \frac{1}{3}\begin{pmatrix} -7 \\ 4 \end{pmatrix} + \frac{2}{3}\begin{pmatrix} 2 \\ -2 \end{pmatrix}$$

$$P = \begin{pmatrix} \frac{1\times(-7)+2\times2}{3} \\ \frac{1\times4+2\times(-2)}{3} \end{pmatrix} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

Point Q (Further from A, Ratio 2 : 1):

$$Q = \frac{2}{3}B + \frac{1}{3}A = \frac{2}{3}\begin{pmatrix} -7 \\ 4 \end{pmatrix} + \frac{1}{3}\begin{pmatrix} 2 \\ -2 \end{pmatrix}$$

$$Q = \begin{pmatrix} \frac{2\times(-7)+1\times 2}{3} \\ \frac{2\times 4+1\times(-2)}{3} \end{pmatrix} = \begin{pmatrix} -4 \\ 2 \end{pmatrix}$$

$$\boxed{P = (-1,\, 0) \qquad Q = (-4,\, 2)}$$

Graph of the line segment AB with trisection points P and Q

figs/1.jpg