



Centroid is the POI of medians.

Graph $\triangle ABC$ given $A(-6, 7)$, $B(10, 1)$ and $C(-2, -7)$. Draw the medians, AP, BQ and CR.

Determine the equation of the line of each median. Find the centroid by solving for the point of intersection using any *two* lines.

$$M_{CB} = \left(\frac{10-2}{2}, \frac{1-7}{2}\right) = (4, -3), \quad m_{AE} = \frac{7-(-3)}{-6-4} = \frac{10}{-10} = -1, \quad y = -x + b$$

Use $A(-6, 7)$: $7 = -(-6) + b$, $b = 7 - 6$, $b = 1$, $y = -x + 1$

$$M_{AB} = \left(\frac{-6+10}{2}, \frac{7+1}{2}\right) = (2, 4), \quad m_{CD} = \frac{4-(-7)}{2-(-2)} = \frac{11}{4}, \quad y = \frac{11}{4}x + b$$

Use $C(-2, -7)$: $-7 = \frac{11}{4}(-2) + b$, $b = -7 + \frac{11}{2}$, $b = \frac{11}{2} - \frac{14}{2} = -\frac{3}{2}$

$$y = \frac{11}{4}x - \frac{3}{2}$$

Solve the system to find POI:

$$\begin{cases} y = -x + 1 \\ y = \frac{11}{4}x - \frac{3}{2} \end{cases}$$

Comparison:

$$-x + 1 = \frac{11}{4}x - \frac{3}{2}$$

$$-4x + 4 = 11x - 6$$

$$11x + 4x = 4 + 6, \quad 15x = 10$$

$$x = \frac{10}{15} = \frac{2}{3}$$

$$y = -\frac{2}{3} + 1 = -\frac{2}{3} + \frac{3}{3} = \frac{1}{3}$$

POI: $\left(\frac{2}{3}, \frac{1}{3}\right)$

Centroid