

Assignment 1

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Question:

A(-1, 3), B(4,2) and C(3,-2) are the vertices of a triangle.

- (a) Find the coordinates of the centroid G of the triangle
- (b) Find the equation of the line through G and parallel to AC.

Solution:

1. Using centroid formula, the desired point G is given by:

$$\begin{aligned} G &= \frac{A + B + C}{3} \\ &= \frac{1}{3}\{(-1, 3) + (4, 2) + (3, -2)\} \\ &= \frac{1}{3}(6, 3) \\ &= (2, 1) \end{aligned}$$

2. Let L be the line that passes through G such that $L \parallel AC$ Then, slope of L is equal to slope of AC.

$$\begin{aligned} m &= \frac{y_C - y_A}{x_C - x_A} \\ &= \frac{-2 - 3}{3 - (-1)} \\ &= \frac{-5}{4} \end{aligned}$$

G satisfies the line.

$$\begin{aligned} y_G &= mx_G + c \\ c &= y_G - mx_G \\ &= 1 + \frac{-5}{4} \times 2 \\ &= 1 - \frac{5}{2} \\ &= \frac{-3}{2} \end{aligned}$$

Thus, line L is $y = \frac{-5}{4}x - \frac{3}{2}$