Assignment 1

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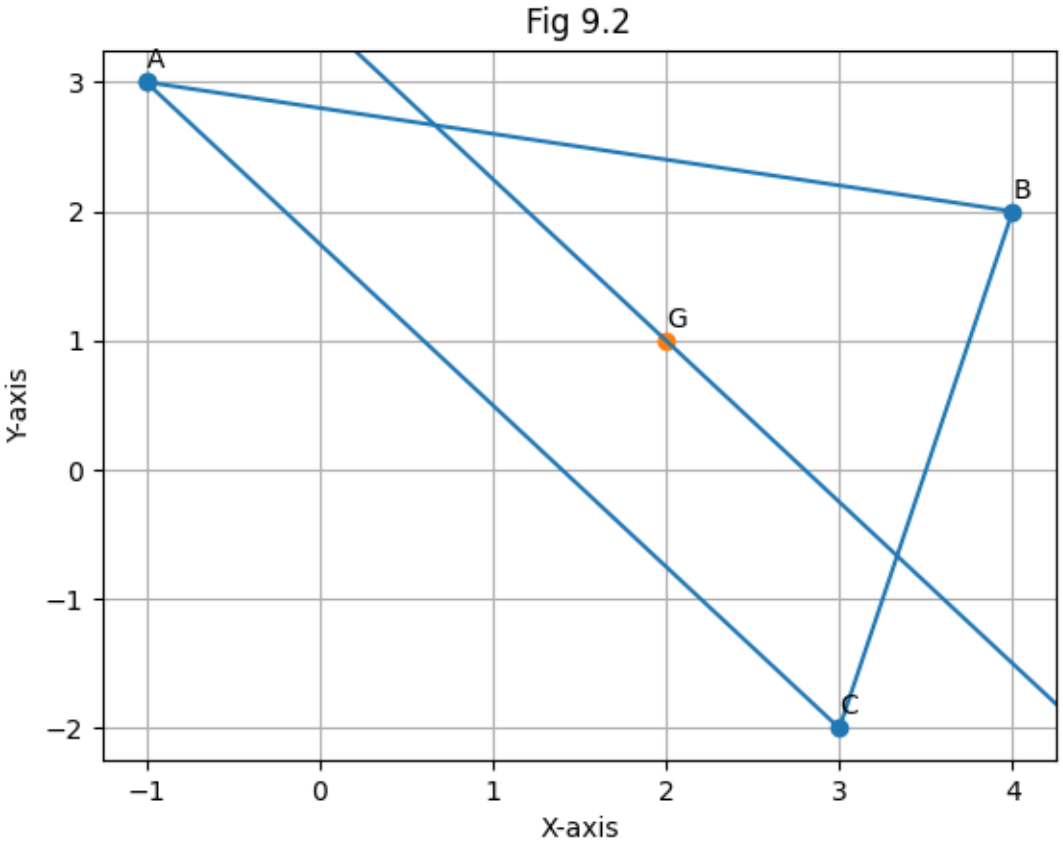
Question:

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.

$$\begin{aligned} y_G &= mx_G + c \\ c &= y_G - mx_G \\ &= 1 - \frac{(-5)}{4} \times 2 \\ &= 1 + \frac{5}{2} \\ &= \frac{7}{2} \end{aligned}$$

Thus, line L is $y = \frac{-5}{4}x + \frac{7}{2}$