MATH 403 FALL 2021: QUIZ 2
DATE: SEP 8, 2021

(a) (3 points) Write down the definition of a parallelogram.

Solution. Four points A, B, C, D define a parallelogram $ABCD$ if $A + C = B + D$.

(b) (2 points) Let $A = (1, 2)$, $B = (3, -2)$, $C = (5, 6)$. Is there a point $D \in \mathbb{R}^2$ such that A, B, C, D forms a parallelogram? If so, find the point D.

Solution. By the defining equation $A + C = B + D$, we have

$$D = A + C - B = (1 + 5 - 3, 2 + 6 - (-2)) = (3, 10).$$

(c) (3 points) Write down the definition of the centroid of a triangle $\triangle ABC$.

Solution. The *centroid* of a triangle is a unique point in the intersection of three medians. The centroid can be written as

$$G = \frac{1}{3}(A + B + C).$$

(d) (2 points) Let $A = (1, 2)$, $B = (3, -2)$, $C = (5, 6)$. Find the centroid of $\triangle ABC$.

Solution.

$$G = \frac{1}{3}(A + B + C) = (\frac{1}{3}(1 + 3 + 5), \frac{1}{3}(2 + (-2) + 6)) = (3, 2).$$