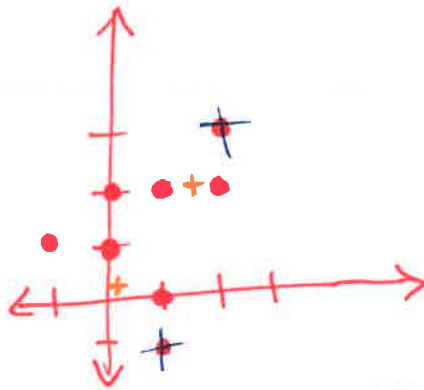1. Run K-Means on the data below. Assume $K = 2$ and $\mu_1 = (1, -1)$ and $\mu_2 = (2, 3)$. What are the final cluster centers? (7 points)

Sample	x_1	x_2
s_1	-1	1
s_2	0	1
s_3	0	2
s_4	1	-1
s_5	1	0
s_6	1	2
s_7	2	2
s_8	2	3

Iter 1:
$$C_2 = \{(0,2),(1,2),(2,2),(3,3)\}$$
$$C_1 = \{(-1,1),(0,1),(1,0),(1,-1)\}$$
$$\mu_2 = \left(\frac{6}{4}, \frac{8}{4}\right) = \left(1\tfrac{1}{2}, 2\right)$$
$$\mu_1 = \left(\frac{1}{4}, \frac{1}{4}\right)$$

Iter 2 $C_1 = \{(-1,1),(0,1),(1,0),(1,-1)\}$
$C_2 = \{(0,2),(1,2),(2,2),(3,2)\}$

$$\mu_2 = \left(1\tfrac{1}{2}, 2\right)$$
$$\mu_1 = \left(\tfrac{1}{4}, \tfrac{1}{4}\right) \quad \text{no change.}$$

2. Name two similarities and one difference between K-NN and K-Means. (3 points)

Sim 1: Both have hyperparameter k.

Sim 2: Both rely on distance as a means of computing similarity

diff: one (K-NN) is supervised the other (K-means) is unsupervised.