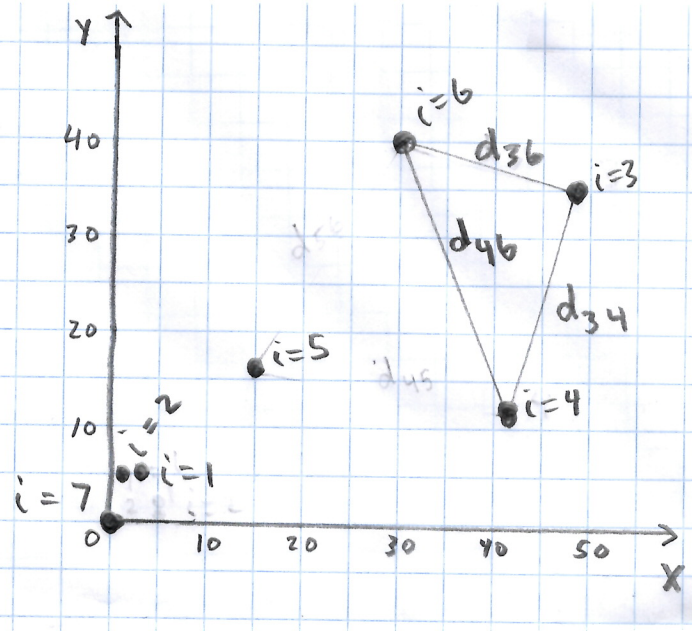
ADS Assignment 8

K-Nearest Neighbors

	given				determine			
(X_i, Y_i)	(2,5)	(1,5)	(48,35)	(42,12)	(15,16)	(30,40)	(0,0)	
class	1	1	2	2	1	2	1	K=1
	1	1	2	2	1	2	1	K=2
	1	1	2	2	1	2	1	K=3
i	1	2	3	4	5	6	7	



compute distances not obvious for ranking nearness:

$$d_{34} = \sqrt{6^2 + 23^2} = 23.8$$

K=1:

$C^{(5)}$: nearest point is (2,5) $\therefore C^{(5)} = 1$ (by inspection)

$C^{(6)}$: nearest point is (48,35) $\therefore C^{(6)} = 2$ (by inspection)

$C^{(7)}$: " " " (1,5) $\therefore C^{(7)} = 1$

K=2:

$C^{(5)}$: nearest 2 points: (2,5), (1,5) $\therefore C^{(5)} = 1$

$C^{(6)}$ " 2 " : (48,35), (42,12) $\therefore C^{(6)} = 2$

$C^{(7)}$ " 2 " : (1,5), (2,5) $\therefore C^{(7)} = 1$

} all unanimous votes

K=3:

For $i \in (5,6,7)$, class determined by majority of 3

Since for K=2 all votes were unanimous, classes are same for K=3!