---

**1**

(1*pt*) Using the euclidean metric ($L_2$), calculate the distance between (4,13) and (-8,5).
(1*pt*) Using the manhattan metric ($L_1$), calculate the distance between (7,5) and (4,-4).
(1*pt*) Using the chebyshev metric ($L_\infty$), calculate the distance between (1,10) and (14,12).

---

**2**

Suppose you are given the following training set.

| Example | Feature 1 | Feature 2 | Label |
|---|---|---|---|
| A | 5 | 6 | 0 |
| B | 4 | 8 | 0 |
| C | 1 | 0 | 1 |
| D | 8 | 9 | 0 |
| E | 4 | 3 | 1 |

(1*pt*) What class would 1-nearest-neighbor assign the test example (2,1)?
(2*pt*) What class would 1-nearest-neighbor assign the test example (0,0)?
(4*pt*) What class would 3-nearest-neighbor assign the test example (4,5)?

---

**3**

Suppose you are given the following examples.

| Example | Feature 1 | Feature 2 |
|---|---|---|
| A | 1 | 0 |
| B | 3 | 0 |
| C | 5 | 0 |
| D | 7 | 0 |
| E | 9 | 0 |
| F | 1 | 4 |
| G | 3 | 4 |
| H | 5 | 4 |
| I | 7 | 4 |
| J | 9 | 4 |
| K | 11 | 0 |
| L | 13 | 0 |
| M | 15 | 0 |
| O | 11 | 4 |
| P | 13 | 4 |
| Q | 15 | 4 |

(1*pt*) Plot the above examples on a graph.
(1*pt*) Suppose we initialize k-means-clustering (k=2) with the points I and J. Circle the clusters that the algorithm converges upon.