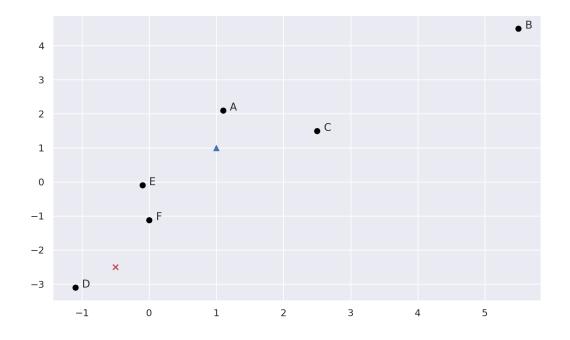# HW5 Questions

1. Calculate the Euclidean distance of the following two points by hand:

$$a = [1, 1.5, 2], b = [-1, -3, -1.5]$$

   answer: $D(a, b) = \sqrt{(1+1)^2 + (1.5+3)^2 + (2+1.5)^2} = \sqrt{36.5}$

2. Consider the following 2D points (black dots) and centroid locations (cross and triangle). Use the following data and centroids, perform one iteration of K-means:

```
1  data = [
2      [1.1,  2.1],   # A
3      [5.5,  4.5],   # B
4      [2.5,  1.5],   # C
5      [-1.1, -3.1],  # D
6      [-0.1, -0.1],  # E
7      [0,  -1.12]    # F
8  ]
9  centroids = {
10     "centroid0": [-0.5, -2.5],  # cross
11     "centroid1": [1, 1]         # triangle
12 }
```


   (a) What's the return value of `assign_data_to_closest_centroid` on Point A?
       answer: `"centroid1"`

(b) What's the return value of `update_assignment`?

answer:

```
{
    "centroid0": [[-1.1, -3.1], [0, -1.12]],
    "centroid1": [[1.1, 2.1], [5.5, 4.5], [2.5, 1.5], [-0.1, -0.1]]
}
```

(c) Where are the new centroids' locations after `update_centroids`? Mark them on the graph

answer:

```
{
    "centroid0": [-0.55, -2.11],
    "centroid1": [2.25, 2]
}
```