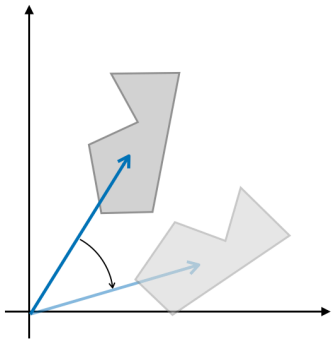
Homework 5

1. Find a transformation (a rotation around the origin) that turns the polygon as shown in the graph if the angle is:

   a) -45^0 (clockwise)

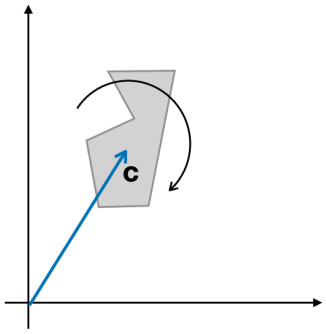
   b) 30^0 (counterclockwise)



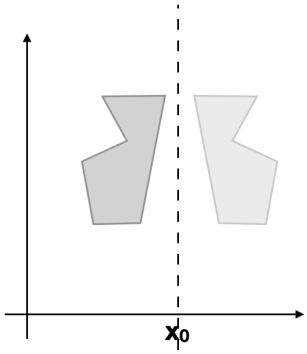
2. Find a transformation that rotates the polygon around vector **c** if:

   a) c = [2, 3], angle = -90^0

   b) c = [-1, 4], angle = 45^0

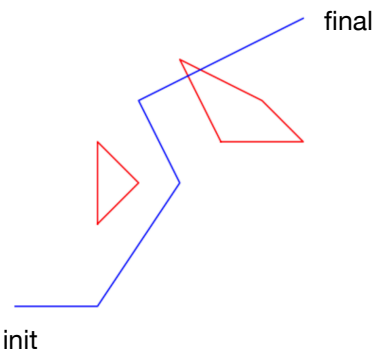


3. Find a transformation that flips the polygon as shown in the graph around vertical axis $x_0 = 4$.



4. Optional. (40 points max, two weeks problem)

   You need to develop a software function that takes as an input two vectors that represent the initial and the final position of the robot and the list of obstacles (shown as red polygons) represented by



convex polygons. The function needs to return a polyline (the list of vectors) that starts with the initial vector and finishes with the final vector and must not intersect the given obstacles.

Submitting your code. Please take robot_navigation.py as a template, modify it, test it, and then send it to me for the final assessment. I will run it using 5 different input conditions in terms of initial and final positions and the obstacles.