# Homework 5

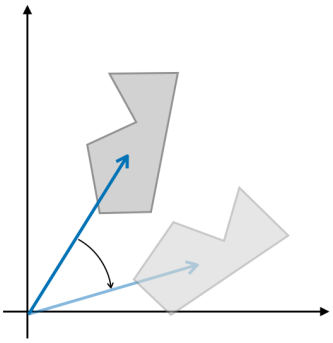
1. Select orthogonal matrices. Explain your choice:

$$A = \begin{bmatrix} 2 & 0 \\ 0 & \frac{1}{2} \end{bmatrix} \quad B = \begin{bmatrix} 0 & -0.5 \\ 0.5 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 0.6 & -0.8 \\ 0.8 & 0.6 \end{bmatrix} \quad D = \begin{bmatrix} 0.8 & 0.6 \\ 0.6 & -0.8 \end{bmatrix} \quad E = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$

2. 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)

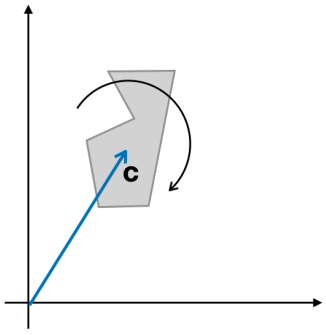
   b) $30^0$ (counterclockwise)



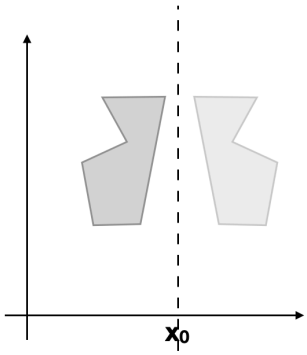
3. Find a transformation that rotates the polygon around vector **c** if:

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

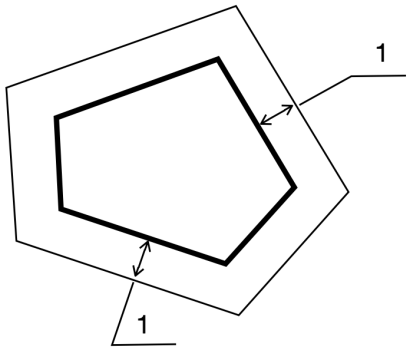
   b) c = [-1, 4], angle = $45^0$




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



5. *Optional*.




For any convex polygon (drawn with thick lines) given as a list of its corners:

[ $(x_1, y_1), (x_2, y_2)$ , … ]

find a polygon that is enlarged as shown in the the diagram.

Every distance between corresponding sides of the given and the enlarged polygons equals one.