

Lista 4

① a) $\theta = \pi/2 = 90^\circ$

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \cdot \begin{pmatrix} 2 & 5 & 5 & 2 \\ 1 & 1 & 2 & 2 \end{pmatrix} = \begin{pmatrix} -1 & -1 & -2 & -2 \\ 2 & 5 & 5 & 2 \end{pmatrix}$$

$$A_1 = (-1, 2)$$

$$B_1 = (-1, 5)$$

$$C_1 = (-2, 5)$$

$$D_1 = (-2, 2)$$

b) origem

$$\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \begin{pmatrix} -1 & -1 & -2 & -2 \\ 2 & 5 & 5 & 2 \end{pmatrix} = \begin{pmatrix} 1 & 1 & 2 & 2 \\ -2 & -5 & -5 & -2 \end{pmatrix}$$

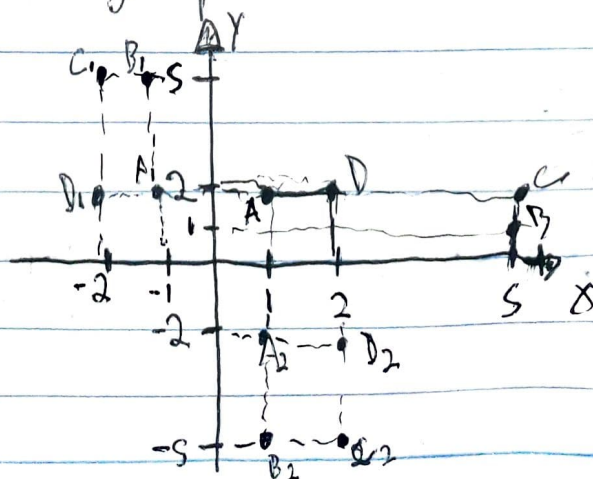
$$A_2 = (1, -2)$$

$$B_2 = (1, -5)$$

$$C_2 = (2, -5)$$

$$D_2 = (2, -2)$$

Gráfico



2-) a) eixo X

$$\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix} \begin{pmatrix} -3 & 1 & 3 \\ 1 & -3 & 3 \end{pmatrix} = \begin{pmatrix} -3 & 1 & 3 \\ -1 & 3 & -3 \end{pmatrix}$$

$$A_1 = (-3, -1)$$

$$B_1 = (1, 3)$$

$$C_1 = (3, 3)$$

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b) expansão de fato $d=2$

$$\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} \begin{pmatrix} -3 & 1 & 3 \\ -1 & 3 & -3 \end{pmatrix} = \begin{pmatrix} -6 & 2 & 6 \\ -2 & 6 & -6 \end{pmatrix}$$

$$A_2 = (-6, -2)$$

$$B_2 = (2, 6)$$

$$C_2 = (6, -6)$$

c) rotação $\theta = \pi/2 = 90^\circ$

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \begin{pmatrix} -6 & 2 & 6 \\ -2 & 6 & -6 \end{pmatrix} = \begin{pmatrix} 2 & -6 & 6 \\ -6 & 2 & 6 \end{pmatrix}$$

$$A_3 = (2, -6)$$

$$B_3 = (-6, 2)$$

$$C_3 = (6, 6)$$

