PROBLEM #1

$$A = \begin{bmatrix} 1/2 & -1 \\ 0 & 3/4 \end{bmatrix} = \frac{1}{4}\begin{bmatrix} 2 & -4 \\ 0 & 3 \end{bmatrix}.$$

$$r = [3 \ 2]^T$$

What is y in $Ar = y$

$$= \frac{1}{4}\begin{bmatrix} 2 & -4 \\ 0 & 3 \end{bmatrix}\begin{bmatrix} 3 \\ 2 \end{bmatrix}$$

$$= \frac{1}{4}\begin{bmatrix} -2 \\ 6 \end{bmatrix}$$

$$= \frac{1}{2}\begin{bmatrix} -1 \\ 3 \end{bmatrix}$$

PROBLEM #2

What is s in $Ar = s$.

$$A = \begin{bmatrix} 1/2 & -1 \\ 0 & 3/4 \end{bmatrix}, \quad r = [-2 \ 4]^T$$

$$s = \frac{1}{4}\begin{bmatrix} 2 & -4 \\ 0 & 3 \end{bmatrix}\begin{bmatrix} -2 \\ 4 \end{bmatrix}$$

$$= \frac{1}{4}\begin{bmatrix} -20 \\ 12 \end{bmatrix}$$

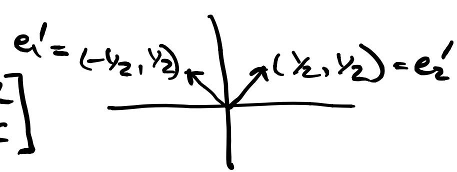
$$= \begin{bmatrix} -5 \\ 3 \end{bmatrix}$$

PROBLEM #3.

Draw the transformations of the basis vectors $\hat{e}_1, \hat{e}_2$ for Matrix M.

mirror over y & 45° rot.

$$M = \begin{bmatrix} -1/2 & 1/2 \\ 1/2 & 1/2 \end{bmatrix} \qquad M\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{2}\begin{bmatrix} y-x \\ y+x \end{bmatrix}$$



PROBLEM #4.

What matrix transformation corresponds to a left 45° rotation.

$$\hat{e}_1 \rightarrow e_1' \Leftrightarrow [1\ 0]^T \rightarrow [1\ 1]^T$$

$$\hat{e}_2 \rightarrow e_2' \Leftrightarrow [0\ 1]^T \rightarrow [-1\ 1]^T$$

$$\begin{matrix} A\hat{e}_1 = e_1' \\ A\hat{e}_2 = e_2' \end{matrix} \longrightarrow \begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$$

, formed by the columns of the basis primes

PROBLEM #5

Multiply M_1 and M_2

$$M_1 = \begin{bmatrix} 1 & 0 \\ 0 & 8 \end{bmatrix}, M_2 = \begin{bmatrix} 1 & 0 \\ -\frac{1}{2} & 1 \end{bmatrix}$$

$$M_1 M_2 = \begin{bmatrix} 1 & 0 \\ 0 & 8 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -\frac{1}{2} & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 \\ -4 & 8 \end{bmatrix}$$

PROBLEM #6.

Do nothing. Have fun.