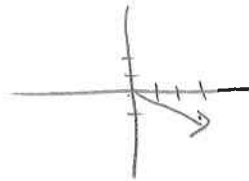


Instructions: Show all work. Be sure to solve each equation to the end. Use exact answers unless specifically asked to round.

1. Graph the vector $\begin{bmatrix} -1 \\ 3 \end{bmatrix}$, then on a separate graph, plot the vector under the indicated linear transformation. Use that information to determine what kind of linear transformation it is: reflection (specify the axis), rotation, expansion or compression (specify direction), shear, other.

a. $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} -1 \\ 3 \end{bmatrix} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$



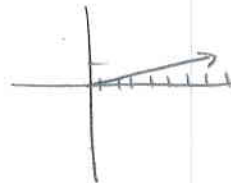
reflection over $x_1 = x_2$ line

b. $A = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} -1 \\ 3 \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$



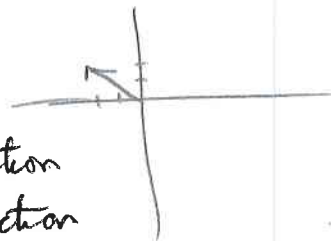
reflection over x_2 axis

c. $A = \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} -1 \\ 3 \end{bmatrix} = \begin{bmatrix} -1+9 \\ 3 \end{bmatrix} = \begin{bmatrix} 8 \\ 3 \end{bmatrix}$



shear in the x_1 direction

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



expansion in x_1 direction
contraction in x_2 direction

