Transform a Vector Using Matrices 15.4

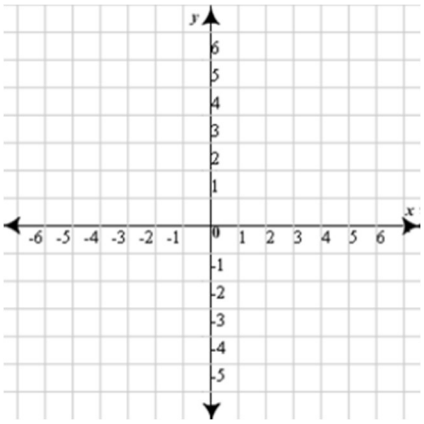
Review: Multiply $\begin{bmatrix} a & b \\ c & d \end{bmatrix}\begin{bmatrix} e \\ f \end{bmatrix}$

Matrix transformations include dilation, rotation, and reflection.

Dilation

To dilate a vector $v = \langle a, b \rangle$, multiply by the matrix $\begin{bmatrix} c & 0 \\ 0 & c \end{bmatrix}$ where a, b, and c are real numbers and c is not equal to zero.

Example: Stretch the vector $v = \langle 1,2 \rangle$ by a factor of 2.



Rotate

To rotate the vector multiply by the matrix

Reflect

To reflect the vector across the x-axis use the matrix

To reflect the vector across the y-axis use the matrix

To reflect the vector across the origin use the matrix

Example: Reflect the vector $v = \langle 1,2 \rangle$ across the origin