$A = \begin{bmatrix} -4 & 1 \\ 2 & -2 \end{bmatrix}$ $B = \begin{bmatrix} 5 & 2 \\ -1 & -3 \end{bmatrix}$ $= A\left(B\left(\begin{bmatrix} 0 \\ 1 \end{bmatrix}\right)\right)$

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

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

$= \begin{bmatrix} 2 \\ -3 \end{bmatrix}\begin{bmatrix} 8 \\ 2 \end{bmatrix}$

$= \begin{bmatrix} -6 \\ -1 \end{bmatrix}$

$= \begin{bmatrix} -4 & 1 \\ 2 & -2 \end{bmatrix}\left(\begin{bmatrix} 2 \\ -3 \end{bmatrix}\right)$

$= \left[2\begin{bmatrix} -4 \\ 2 \end{bmatrix} - 3\begin{bmatrix} 1 \\ -2 \end{bmatrix}\right]$

$= \begin{bmatrix} -8 \\ 4 \end{bmatrix}\begin{bmatrix} -3 \\ 6 \end{bmatrix}$

$= \begin{bmatrix} -11 \\ 10 \end{bmatrix}$

How do Transformation works?

- First do the right side of the transformation.
- Second the left one

Transformation is another term for graph functions ($f(x)$)

$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} \Rightarrow$ 90° Rotation Counterclockwise

$\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} \Rightarrow$ Shear

$\begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} x + 3y \\ 2x + y \end{bmatrix} = \begin{bmatrix} 3xy \\ 2xy \end{bmatrix}$

Scale = Multiply

Translation = Add

Rotation = $X' = X^* Cos(A) + Y^* - Sin(A)$ } Anti-Clockwise

$Y' = X^* Sin(A) + Y^* Cos(A)$

$\begin{bmatrix} Cos(\theta) & -Sin(\theta) \\ Sin(\theta) & Cos(\theta) \end{bmatrix}$ or $\begin{bmatrix} Cos(\theta) & Sin(\theta) \\ -Sin(\theta) & Cos(\theta) \end{bmatrix}$ for Clockwise

8

1

9

1

0