

1. [4 points] Compute $\begin{bmatrix} 4 & 1 \\ 0 & 1 \\ -1 & 3 \end{bmatrix} \begin{bmatrix} 2 & 0 & -1 \\ 5 & 2 & 1 \end{bmatrix}$.

$4 \cdot 0 + 1 \cdot 2 = 2$,
 etc.

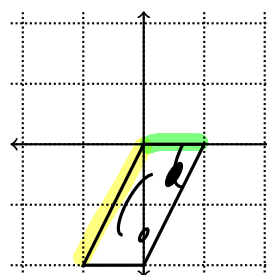
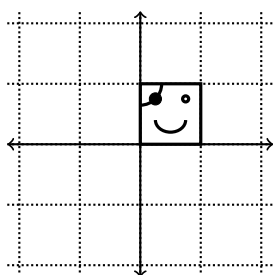
$$\begin{bmatrix} 13 & 2 & -3 \\ 5 & 2 & 1 \\ 13 & 6 & 4 \end{bmatrix}$$

2. [2 points] Give an example of two 2×2 matrices A and B such that $AB = BA$.

$$A = \begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}, \quad B = \begin{bmatrix} 4 & 0 \\ 0 & 5 \end{bmatrix}, \quad \text{e.g.}$$

3. [4 points] Oh no, a witch cast another linear transformation spell on Victor!

On the left is Victor's original form, and on the right is Victor after the witch applies the linear transformation T .



Below, draw what Victor looks like after the witch applies T again.

$$T(\vec{x}) = \begin{bmatrix} -1 & 1 \\ -2 & 0 \end{bmatrix} \vec{x}$$

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

