

1. **Matrix multiplication:** Let

$$A = \begin{bmatrix} 1 & -1 \\ 3 & 2 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 0 & 2 \\ -4 & 1 \end{bmatrix}.$$

What is AB ? What is BA ?

2. What is the dimension of a 4×2 matrix times a 2×3 matrix? Could you multiply them the other way around?

3. **Rotate:** Let

$$\vec{y} = \begin{bmatrix} 0 \\ y \end{bmatrix}.$$

What are the new coordinates if \vec{y} is rotated θ (counter-clockwise)?

4. **Scale:** What scaling matrix could you use to get $[2 \ 3]^T$ from $[-5 \ 6]^T$?

5. **Composition:** What transformations could we apply to the house below to rotate it 25 degrees about its center?

