Week 4 Day 3

Doodling More Symmetric Aliens

Make sure you know your neighbors' names. Then take about 2 minutes to work together to do the following:

For each of the following matrices, draw a 2-dimensional alien creature for whom that matrix is a symmetry (ie, applying the linear transformation represented by the matrix does not change how that alien looks) — if this is possible! If it's impossible for one of the matrices, explain why.

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

Linear Transformations (Again)

1. Let A be the following matrix.

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

Which of the following statements is true about the vector $\mathbf{v} = (1, 1)$?

(A) $\mathbf{v}$ is in the column space of A.

(B) $\mathbf{v}$ is in the null space of A.

(C) Both of the above.

(D) None of the above.

2. Let A be the following matrix.

$$\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

Which of the following statements is true about the vector $\mathbf{v} = (1, -1, 1)$?

(A) $\mathbf{v}$ is in the column space of A.

(B) $\mathbf{v}$ is in the null space of A.

(C) Both of the above.

(D) None of the above.

3. Find a matrix A such that the set below is the column space of A.

$$\left\{ \begin{bmatrix} 2x+3y \\ x-y+z \\ x+z \\ 3y-2z \end{bmatrix} : x, y, z \text{ real} \right\}$$