Week 4 Day 1

Doodling Symmetric Aliens

Make sure you know your neighbors' names. Then take about 2 minutes to work together to draw a 2-dimensional alien creature for whom the following matrix is a symmetry (ie, applying the linear transformation represented by the matrix does not change how your alien looks).

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

Once you have an alien you like, see if you can find a different matrix that represents a symmetry of that alien!

Vector Spaces

1. Let

$$S = \left\{ \begin{bmatrix} y - z \\ y \\ z \end{bmatrix} : y, z \text{ are real numbers} \right\}.$$

Which of the following vectors is an element of S?

(A) $(-1, 1, 2)$

(B) $(0, 1, 2)$

(C) $(3, 1, -2)$

(D) None of the above OR more than one of the above.

2. (A) True or (B) False? The set

$$S = \left\{ \begin{bmatrix} y - z \\ y \\ z \end{bmatrix} : y, z \text{ are real numbers} \right\}$$

is a subspace of $\mathbb{R}^3$.

3. Recall that $\mathbb{P}_2 = \{p(t) = at^2 + bt + c \mid a, b, c \text{ real}\}$ is the vector space of polynomials of degree at most 2. Which of the following is a subspace of $\mathbb{P}_2$?

(A) Polynomials of the form at^2 for some real number a.

(B) Polynomials of degree exactly equal to 2.

(C) Polynomials $p(t)$ such that $p(3) = 0$.

(D) None of the above OR more than one of the above.