1. (5 points) Find a basis for the null space of the matrix
\[
\begin{bmatrix}
1 & 2 & 0 \\
0 & -1 & 1 \\
1 & 0 & 2 \\
\end{bmatrix}
\]

2. (5 points, 1 each) Determine whether the following statements are True or False. Give a short explanation (or an example or counter-example) in each case. (No credit without explanation).

(a) The subspace \( \{0\} \) is called the null-space.

(b) If \( S \) is a linearly independent subset and \( \text{Span } S = V \), then \( S \) is a generating set for \( V \).

(c) \( \mathbb{R}^3 \) contains at least three different subspaces.

(d) A vector \( \mathbf{v} \) is in \( \text{Col}A \) if and only if \( A\mathbf{x} = \mathbf{v} \) is consistent.

(e) The pivot columns of the matrix \( A \) (i.e. the columns corresponding to the pivot columns of the reduced-row-echelon form \( R \), but those of \( A \), not of \( R \)) always form a basis for its column space.