1. True or false? Justify your answer.

(a) If none of the \( \mathbb{R}^3 \) vectors in the set \( S = \{ \mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3 \} \) is a multiple of one of the other vectors, then \( S \) is linearly independent.

(b) If a system of linear equations has two different solutions, then it must have infinitely many solutions.

Each part is worth 5 points.

**Bonus (5 points)** Let \( T: \mathbb{R}^n \to \mathbb{R}^m \) be a linear transformation. Prove that \( T \) is one-to-one if and only if the equation \( T(\mathbf{x}) = \mathbf{0} \) has only the trivial solution.