Math 131, Fall 18 Discussion Section Worksheet 4

Let V be a vector space.

- 1. Let $W = \{(x, y) \in \mathbb{R}^2 | x^2 = y^2 \}.$
 - (a) Sketch W as a subset of \mathbb{R}^2 .
 - (b) Prove or disprove: W is a subspace of \mathbb{R}^2 .

2. True/False:

- (a) If v_1, \ldots, v_n is a linearly dependent list, then each element is a linear combination of other elements of S.
- (b) Any set containing the zero vector is linearly dependent.
- (c) Subsets of linearly dependent sets are linearly dependent.
- (d) Subsets of linearly independent sets are linearly independent.

- 3. Let $U = \{(z_1, z_2, z_3, z_4, z_5) \in \mathbb{C}^5 : 6z_1 = z_2 \text{ and } z_3 + 2z_4 + 3z_5 = 0\}.$
 - (a) Find a basis for U.
 - (b) Extend the basis for U to a basis for \mathbb{C}^5 .

4. Prove or give a counterexample: If v_1, v_2, v_3, v_4 is a basis of a vector space V and U is a subspace of V such that $v_1, v_2 \in U$ and $v_3, v_4 \notin U$, then v_1, v_2 is a basis of U.