# Math 131, Fall 18 Discussion Section Worksheet 4 

Let $V$ be a vector space.

1. Let $W=\left\{(x, y) \in \mathbb{R}^{2} \mid x^{2}=y^{2}\right\}$.
(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 $U=\left\{\left(z_{1}, z_{2}, z_{3}, z_{4}, z_{5}\right) \in \mathbb{C}^{5}: 6 z_{1}=z_{2}\right.$ and $\left.z_{3}+2 z_{4}+3 z_{5}=0\right\}$.
(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 $U$.
