# CIS 1600 Recitation 7

## Independence, Trees

October 10, 2023

# Trees

For an $n$-vertex graph $G$, the following are equivalent and characterize trees with $n$ vertices.

1. $G$ is a tree (in other words, connected and acyclic)
2. $G$ is connected and has exactly $n-1$ edges.
3. $G$ is minimally connected, i.e., $G$ is connected but $G - \{e\}$ is disconnected for every edge $e \in G$.
4. $G$ is maximally acyclic, ie., contains no cycle but $G + \{x, y\}$ does, for any two non-adjacent vertices $x, y \in G$.
5. Any two vertices of $G$ are linked by a unique path in $G$.