

PROBLEM 1 (TRUE OR FALSE?) *For each statement, state whether it is true or false, and give a quick explanation.*

- *In any graph, the number of vertices of odd degree must be even.*
- *If there is a **walk** from u to v , there is a **path** from u to v .*
- *If every vertex in a graph has degree 2, it is a cycle.*
- *If a directed graph has no cycles, it can not contain more edges than vertices.*
- *In a directed graph, the smallest cycle has length 3.*
- *A graph with n vertices and $n - 1$ edges is connected.*
- *Adding a new edge to a tree creates exactly one cycle.*
- *There can only be one path between any two vertices on a tree.*
- *A graph with no edges is bipartite.*
- *All trees are bipartite.*

PROBLEM 2 Which of the following graphs are bipartite? For those that are, give a bipartition. For those that aren't, prove that they are not.

