1) 20 pts
Mark the following statements as **TRUE**, **FALSE,** or **UNKNOWN**. No need to provide any justification.

[TRUE/FALSE/UNKNOWN]
If X≤p Y, and X is NP-complete, then Y is NP-hard.

[TRUE/FALSE/UNKNOWN]
If X≤p Y, and X is NP-complete, then Y is NP-complete.

[TRUE/FALSE/UNKNOWN]
If X≤p Integer Programming, then X is NP-hard.

[TRUE/FALSE/UNKNOWN]
If X≤p Linear Programming, then X is in P.

[TRUE/FALSE/UNKNOWN]
3-SAT cannot be solved in polynomial time.

[TRUE/FALSE/UNKNOWN]
If graph G has no cycles, then the independent set problem in G can be solved in polynomial time.

[TRUE/FALSE]
Although the general Travelling Salesman Problem is NP-complete, in class, we presented a 2-approximation algorithm for it that runs in polynomial time.

[TRUE/FALSE]
Breadth first search is an example of a divide-and-conquer algorithm.

[TRUE/FALSE]
Memoization requires memory space which is linear in size with respect to the number of unique sub-problems.

[TRUE/FALSE]
The smallest element in a binary max-heap of size *n* can be found with at most *n/2* comparisons.