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

[TRUE/FALSE]
To prove that a problem X is NP-complete, it is sufficient to prove that 3SAT is polynomial time reducible to X.

[TRUE/FALSE]
Finding the minimum element in a binary max heap of n elements takes O(log n) time

[TRUE/FALSE]
We are told that in the worst case, algorithm A runs in O(n log n) and algorithm B runs in $O(n^2)$. Based on these facts, there must be some N that when n>N, algorithm A runs faster than algorithm B.

[TRUE/FALSE]
The following recurrence equation $T(n)=3T(n/3) + 0.1\ n$ has the solution: $T(n)= \Theta (n \log(n))$.

[TRUE/FALSE]
Every problem in NP can be solved in exponential time by a deterministic Turing machine

[TRUE/FALSE]
In Kruskal's MST algorithm, if we choose edges in decreasing (instead of increasing) order of cost, we will end up with a spanning tree of maximum total cost

[TRUE/FALSE]
If all edges in a graph have capacity 1, then Ford-Fulkerson runs in linear time.

[TRUE/FALSE]
If problem X can be solved using dynamic programming, then X belongs to P.

[TRUE/FALSE]
If Vertex-Cover $\in$ P then SAT $\in$ P.

[TRUE/FALSE]
Assuming P!=NP, and X is a problem belonging to class NP. There is no polynomial time algorithm for X.