Note: There are three questions on this quiz.

Question 1. State the definition of NP-completeness (by which, as is standard, we mean with respect to $\leq^p_m$ reductions).
Question 2. One sometimes hears it said that “If P equals NP, then all NP sets are NP-complete.” I’m not asking you to discuss the logical truth or falseness of that statement (as there is a subtle issue regarding that, namely, if P ≠ NP, then the statement is logically true (that is, in that case it becomes a vacuous truth); however, I’m more interested in the fact that if the hypothesis of that statement happens to be true, then the statement itself will overall be false. So, your task on this problem is to do the work on that. More specifically, your task is to do this: Give a specific finite set $A$ such that $A$ is an NP set that is not NP-complete (and prove both those facts: that it is in NP and that it is not NP-complete).
Question 3. Let $L_{\log} = \{F \mid F$ is a satisfiable formula in 3CNF form and the number of times a “negation” appears with a symbol in $F$ is at most $\log_2$ of the number of bits in $F\}$. Prove that $L_{\log} \in P$. 