1. Given that $n$ independent random trials are performed and the probability of all failures in the $n$ trials is at most $\epsilon$, find the smallest success probability $p$ of a single trial in terms of $n$ and $\epsilon$.

2. Give an informal description of a nondeterministic Turing machine for the language $L = \{0^m1^n \mid \gcd(m, n) > 1\}$.

3. Express the deterministic time complexity of any problem that has nondeterministic time complexity $O(\log n)$ in terms of $n$, not $\log n$.

4. Prove that if $A \leq_p B$ for all $B \in NP$ and $A$ is $NP$-hard, then all problems in $NP$ are $NP$-complete.

5. Prove that the problem of checking if there is a clique of even size $k$ in an undirected graph is $NP$-complete.