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Modern Complexity Theory

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Assignment 6

Problem 19 (2 points)**:**
The definition of PCP demands that for every $x \in L$ there be a proof π_x for which it holds that $\Pr[M^{\pi_x}$ accepts$] = 1$. This means that π_x can potentially be different for every x. Show that this assumption is not necessary, that is, there exists a proof π which is common to all $x \in L$ so that $\Pr[M^{\pi}$ accepts$] = 1$ whenever $x \in L$. (Hint: construct π out of the various π_x's.)

Problem 20 (6 points)**:**
Prove the following statements:

1. NP $\subseteq$ PCP$(log, poly)$
2. PCP$(O(1), O(\log n)) \subseteq P$
3. PCP$(poly, poly) \subseteq$ NEXP

Problem 21 (2 points)**:**
Explain how the proof of Theorem 8.3 can be extended to adaptive verifiers.