Problem 5 (due on Monday, November 7) Let \$\cal F\$ be the set of all functions \$f:\mathbb R\longrightarrow \mathbb N\$ from the real numbers to natural numbers. Prove that there exists a sequence of functions \$f_1,f_2, f_3,\ldots\$ in \$\cal F\$ such that for every finite set \$A\subseteq \mathbb R\$ and every \$g\in \cal F\$ there is \$i\$ such that \$g(a)=f_i(a)\$ for every \$a\in A\$.

The problem was solved by Levi Axelrod and Ashton Keith. The solutions differ in details but follow similar idea. For a detailed solution and some applications to topology see the following link Solution.

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