1. If A and B are finite show:

   (a) $A \times B$ is finite. (Hint: Show that for $m, n \in \mathbb{N}$ that $I_m \times I_n$ is finite by finding an explicit bijection from $I_m \times I_n$ to I_{mn}. Then use that to show the desired result.)

   (b) $A \cup B$ is finite. (Hint show there exists an injection from $A \cup B$ to A (and B) and use and then use contradiction with the unproved theorem).

2. Show that if $A \subset B$ and B is finite then A is finite.