Problem 79. Prove that the set of prime numbers is countable.

Problem 80. Suppose that $X_n$ is countable for every $n \in \mathbb{N}$. Show that $X = \bigcup_{n \in \mathbb{N}} X_n$ is countable.
(Hint: Use $\mathbb{N} \times \mathbb{N}$ to show that $X$ is countable.)