**Analysis IV**
Exercise 4
2004

1. The problem 1 of Exercise 3.
2. Prove that the collection of disjoint (pistevieras) open sets in $\mathbb{R}^n$ is either finite or countable.
3. Suppose that $f : \mathbb{R}^m \to \mathbb{R}^n$ is continuous. Prove that $f(\overline{A}) \subset \overline{f(A)}$ for all $A \subset \mathbb{R}^m$. Give an example where $f(\overline{A}) \neq \overline{f(A)}$.
4. Let $f$ be a continuous real function on a metric space $X$. Let $\mathbb{Z}(f)$ be the set of all $p \in X$ at which $f(p) = 0$. Prove that $\mathbb{Z}(f)$ is closed.
5. Let $A \subset \mathbb{R}$ and $B \subset \mathbb{R}$ such that $A \subset B$. Prove that $m^*(A) \leq m^*(B)$.
6. Prove Corollary 2.4.