(1) If $A$ is a countable set and $B$ is an uncountable set, prove that $B \setminus A$ has the same cardinal number as $B$.

(2) Let $f$ be a continuous real function on $\mathbb{R}^1$ with the following properties: $0 \leq f(t) \leq 1, f(t + 2) = f(t)$ for every $t$. And $f(t) = 0$ (for $0 \leq t \leq \frac{1}{3}$), $f(t) = 1$ (for $\frac{2}{3} \leq t \leq 1$). Put $\varphi(t) = (x(t), y(t))$ where $x(t) = \sum_{n=1}^{\infty}2^{-n}f(3^{2n-1}t), y(t) = \sum_{n=1}^{\infty}2^{-n}f(3^{2n}t)$. Prove that $\varphi(t)$ is continuous.