Math 470 Assignment 35

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10.6.7. Suppose that E is a compact subset of X.

a) If $f, g : E \to \mathbf{R}^n$ are uniformly continuous, prove that $f + g$ and $f \cdot g$ are uniformly continuous. Did you need compactness for both results?

b) If $g : E \to \mathbf{R}$ is continuous on E and $g(x) \neq 0$ for $x \in E$, prove that $1/g$ is a bounded function.

c) If $f, g : E \to \mathbf{R}$ are uniformly continuous on E and $g(x) \neq 0$ for $x \in E$, prove that f/g is uniformly continuous on E.

proof:

10.6.9. Suppose that X is connected. Prove that if there is a nonconstant, continuous function $f : X \to \mathbf{R}$, then X has uncountable many points.

proof: