1. Let $f : A \to \mathbb{R}$, let U be an open subset of $\mathbb{R}$, and let $E = A \cap U$. Suppose $f|_E$ is continuous at $c \in E$. Prove that f is continuous at c.

2. **(Hand this one in to David.)** Let t be Thomae's function defined on page 102. Prove that for any $c \in [0,1]$, $\lim_{x\to c} t(x) = 0$. Conclude that t is continuous at c if and only if c is irrational.

3. 4.3.2 a

4. 4.3.10

5. 4.4.3

6. Suppose $f : \mathbb{R} \to \mathbb{R}$ and $\lim_{x\to\infty} f(x) = 0$ and $\lim_{x\to-\infty} = 0$. Prove that f is bounded and attains either a minimum or a maximum. Give an example to show that f need not attain both a minimum and maximum.

7. 4.5.3

8. 4.5.4

9. 4.5.6