Name: MAA5616/PQ-03

1. (2 pts.) Let E be a non-empty subset of $\mathbb{R}$, and suppose that $f: E \to \mathbb{R}$ is a function. What does it mean to say f is continuous at a point $x \in E$?? [Definition!! Use complete sentences.]

2. (2 pts.) Suppose that $\langle f_n \rangle$ is a sequence of real-valued functions defined on a non-empty set E and f is a real-valued function defined on E. What does it mean to say the sequence $\langle f_n \rangle$ converges pointwise to f on E ?? [Definition!! Use complete sentences.]

3. (2 pts.) Suppose that $\langle f_n \rangle$ is a sequence of real-valued functions defined on a non-empty set E and f is a real-valued function defined on E. What does it mean to say the sequence $\langle f_n \rangle$ converges uniformly to f on E ?? [Definition!! Use complete sentences.]

4. (2 pts.) Suppose that $\langle f_n \rangle$ is the sequence of real-valued functions defined on [0,1] by $f_n(x) = x^n$ for each $x \in [0,1]$, and f is the real-valued function defined on [0,1] by $f(x) = 0$ for $x \neq 1$ and $f(x) = 1$ for $x = 1$. It turns out that the sequence $\langle f_n \rangle$ converges to f. Is the convergence uniform?? Explain.

5. (2 pts.) Let E be a non-empty subset of $\mathbb{R}$, and suppose that $f: E \to \mathbb{R}$ is a function. What does it mean to say f is uniformly continuous on E ?? [Definition!! Use complete sentences.]