Definition. Let $A \subset \mathbf{R}$ be a subset of the real line, and let $f : A \to \mathbf{R}$ be a real valued function. We say that f is *uniformly continuous* on A if for any $\varepsilon > 0$, there exists a $\delta > 0$ so that if x, $y \in A$ satisfy $|x - y| < \delta$, then $|f(x) - f(y)| < \varepsilon$.

1. Show that the function $f(x) = \frac{1}{x}$ is not uniformly continuous on $(0, 1]$.
2. Show that the function $f(x) = \frac{1}{x}$ is uniformly continous on $[1, +\infty)$.