Problems - 3.5

(5) Show that the function $f(x) = \frac{1}{x}$ is uniformly continuous on $S = [1, \infty)$.

(9) Show using ϵ and δ (not Th. 3.13) that $f(x) = \sqrt{x}$ is uniformly continuous on $I = [0, 1]$.

(10) Suppose the f is uniformly continuous on the half-open interval $I = (0, 1]$. Is it true that f must be bounded on I? If so, prove it. If not, give a counter-example.