## MA 281, Honors Mathematical Analysis III, Spring '06. Extra Homework Sheet \# 1.

1. Decide whether the following functions are uniformly continuous or not. Justify your answer as best as you can (a proof would be best).
(a) $f(x):=\cos x+x^{3}$ on $[0,2 \pi]$.
(b) $f(x):=\cos x+x^{3}$ on $[0,2 \pi)$.
(c) $f(x):=\cos x+x^{3}$ on $\mathbb{R}$.
(d) $f(x):=1 / x$ on $(0,1]$.
(e) $f(x):=1+x$ on $\mathbb{R}$.
2. Suppose $f:(a, b] \longrightarrow \mathbb{R}$ is continuous and $\lim _{x \rightarrow a^{+}} f(x)$ exists and is finite. Is $f$ uniformly continuous?
