Math 325. Quiz #8

(1) Let $f(x) = |2x| - 1$. Prove that $\lim_{x \to 0} f(x) = -1$.

Bonus. Prove or disprove: For the same sequence $\{a_n\}_{n=1}^{\infty}$ where $a_n = n\sqrt{2} - \lfloor n\sqrt{2} \rfloor$, there exists a subsequence that converges to 0.