Let $f_n(x) : \mathbb{R} \to \mathbb{R}$ be the function

$$f_n(x) = \frac{1}{n^3 \left[x - \frac{1}{n}\right]^2 + 1}$$

Let $f : \mathbb{R} \to \mathbb{R}$ be the zero function.
a) Show that $f_n(x) \to f(x)$ for each $x \in \mathbb{R}$
b) Show that f_n does not converge uniformly to f.