Problem Set 8
Math 125B: Winter 2013

Define $f : \mathbb{R} \to \mathbb{R}$ by

$$f(x) = x + 2x^2 \sin\left(\frac{1}{x}\right)$$

Prove that f is differentiable on $\mathbb{R}$ and $f'(0) > 0$, but f is not invertible on any neighborhood of $x = 0$. Why doesn't this example contradict the inverse function theorem?