HW 3-22

① At what $c \in \mathbb{R}$ is the function $g(x) = 2x + |x|$ differentiable?

② (a) If $p \in \mathbb{N}$, $\psi(x) = \sqrt{x^p}$ $(x > 0)$, show that ψ is differentiable, and compute its derivative.

(b) What is wrong with this "solution":

" $\psi(x) = x^{p/2} \implies \psi'(x) = \frac{p}{2} x^{\frac{p}{2} - 1}$, since in class we

proved $(x^n)' = n x^{n-1}$."?

③ Suppose $f : \mathbb{R} \to \mathbb{R}$ is differentiable at $c \in \mathbb{R}$, and $f'(c) = 0$. Prove that f cannot have an inverse function g that is differentiable at $d = f(c)$.