PRACTICE QUIZ 2

1. Let $f(x) := |x|$ and $g(x) := \frac{|x|}{x}$; $f$ is commonly known as the absolute value function, and $g$ is sometimes referred to as the sign function. Determine the domain and range of each function and sketch their graphs.

2. Use the definition of the limit ($f'(x) := \lim_{h \to 0} \frac{f(x+h)-f(x)}{h}$) to prove that $f'(x) = 1$, when $x > 0$, and $f'(x) = -1$, when $x < 0$; in particular, show that $f'(x) = g(x)$, when $x \neq 0$.

3. Conclude from the previous problem that $f'(0)$ does not exist.