

## PRACTICE QUIZ 2

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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 ( $f'(x) := \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ ) 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.