MATH 150A-QUIZ 5, WINTER 2019

Name: _____

1. Consider a function $f : I \to \mathbb{R}$ and let $\xi \in I$ be an interior point.
   (1) (2 pts) State the definition that f has a right limit at ξ. Similarly, state the definition that f has a left limit at ξ.
   (2) (3 pts) Suppose both the left and the right limits of f exist at ξ and equal $f(\xi)$. Show that f is continuous at ξ.

2. (5 pts) Consider $f(x) = \frac{1}{x} : (0, \infty) \to \mathbb{R}$. Show that the right limit of f does not exist at 0.

   Here you may use the following facts:

   - Corollary of Theorem 2.1 we stated in class: let $\xi \in I$, and $I' = I \setminus \{\xi\}$, and $f : I' \to \mathbb{R}$. Then $\lim_{x \to \xi} f(x) = A$ if and only if $\lim_{n \to \infty} f(x_n) = A$ for all sequence $\{x_n\}$ in I' that converges to ξ;
   - Convergent sequences are bounded (one of the theorems we proved in Chap 1).