Math 114 Fall 2017
Calculus I HW 3
Due Wednesday, September 20

1. Let
$$f(x) = \begin{cases} 1 & x < 2 \\ 2 & x = 2 \\ 3 & x > 2 \end{cases}$$
   What is $f(2)$? Prove that $\lim_{x \to 2} f(x)$ does not exist.

2. Let
$$j(x) = \begin{cases} 3x - 1 & x < 0 \\ 2x + 1 & x \geq 0 \end{cases}$$
   Show that $\lim_{x \to 3} j(x) = 7$.

3. ($\star$)For the same function j, show that $\lim_{x \to 0} j(x)$ does not exist.

4. ($\star$) Prove that $\lim_{x \to 0} \frac{|x|}{x}$ does not exist.

5. Compute from the definition $\lim_{x \to 2} \frac{1}{x-2}$.

6. Compute from the definition $\lim_{x \to 5} \frac{x-2}{x-5}$.

7. Compute from the definition $\lim_{x \to -3} \frac{-1}{(x+3)^4}$.