

Math 114 Fall 2018
Calculus I HW 3
Due Wednesday, September 20

1. Let

$$j(x) = \begin{cases} 3x - 1 & x < 0 \\ 2x + 1 & x \geq 0 \end{cases}$$

Show that $\lim_{x \rightarrow 3} j(x) = 7$.

2. (★) For the same function j , show that $\lim_{x \rightarrow 0} j(x)$ does not exist.

3. (★) Prove that $\lim_{x \rightarrow 0} \frac{|x|}{x}$ does not exist.

4. From the definition, prove that $\lim_{x \rightarrow 2} \frac{1}{x - 2} = \pm\infty$.

5. From the definition, prove that $\lim_{x \rightarrow -1} \frac{4}{(x + 1)^2} = +\infty$.

6. From the definition, prove that $\lim_{x \rightarrow 3} \frac{-2}{|x - 3|} = -\infty$.

7. Let a and c be any constants. From the ϵ - δ definition, prove that $\lim_{x \rightarrow a} c = c$.