

CALCULUS 131: ASSIGNMENT 5

Due Friday, October 27, in class. Worth a total of 60 points.

Please answer the following questions:

Section 1.2: Problems 12 (5 points), 24 (5 points) (*Hint: Given ϵ , the fact that $\lim_{x \rightarrow c} G(x) = 0$ gives you a δ . Use the same one for F .*), 27 (5 points) (*Hint: If $x < 0$, what is $|x|$? So what is $\lim_{x \rightarrow 0^-} |x|$?*).

Section 1.3: Problems 4, 6, 10, 14, 20, 26, 28 (3 points each), 49 (4 points).

Problem A: Give an example of two functions $f : \mathbb{R} \rightarrow \mathbb{R}$ and $g : \mathbb{R} \rightarrow \mathbb{R}$ such that $f(x)g(x) = 1$ for all x , and $\lim_{x \rightarrow 0} g(x) = 0$. (4 points)

Problem B: Which of the following are true? If a statement is true, explain why (i.e. prove it). If it is false, give a counterexample. (4 points each)

- (1) If $\lim_{x \rightarrow c} f(x) + g(x)$ exists, then $\lim_{x \rightarrow c} f(x)$ and $\lim_{x \rightarrow c} g(x)$ exist.
- (2) If $\lim_{x \rightarrow c} f(x) + g(x)$ and $\lim_{x \rightarrow c} f(x)$ exist, then $\lim_{x \rightarrow c} g(x)$ exists.
- (3) If $\lim_{x \rightarrow c} f(x)g(x)$ exists, then $\lim_{x \rightarrow c} f(x)$ and $\lim_{x \rightarrow c} g(x)$ exist.
- (4) If $\lim_{x \rightarrow c} f(x)g(x)$ and $\lim_{x \rightarrow c} f(x)$ exist, then $\lim_{x \rightarrow c} g(x)$ exists. (Hint: consider the previous problem).

Bonus Problem: Section 1.2 Problem 30 (5 points).