Math 425: Collected Homework 3, due in lab, 9/28
Fall 2021

Directions: This homework is due on 9/28 at the start of your lab. Late work will not be accepted. Each homework will be worth 10 points, and at least ONE of these points is awarded for "professionalism", meaning that your work is prepared suitably, according to the guidelines below.

- Write your name and lab number at the top of your work.

- Label each problem clearly.

- Make sure that your work is clear. Show your work to gain full credit.

- Do not submit torn or sloppy paper.

- Leave blank space for comments from the grader.

- Staple your work.

1. Evaluate each limit, using methods from our course. State your answer clearly and show work suitably.

    - (a) $\lim\limits_{x \to -3} \dfrac{x-1}{x+3}$.

    - (b) $\lim\limits_{x \to -3} \dfrac{x-1}{(2x+6)^2}$

2.   - (a) The function $g(x)$ obeys the inequality

    $$1 - \frac{x^6}{3} \le g(x) \le 1 + x^2$$

    for all x near 0, except possibly at $x = 0$. If possible, compute

    $$\lim_{x \to 0} g(x).$$

    - (b) The function $G(x)$ obeys the inequality

    $$1 - \frac{x^6}{3} \le G(x) \le 1.1 + x^2$$

    for all x near 0, except possibly at $x = 0$. If possible, compute

    $$\lim_{x \to 0} G(x)$$

    If it is not possible, explain why in one or two complete sentences.

3. You are given the function

$$f(x) = \begin{cases} x^2, & \text{if } x < 2, \\ L, & \text{if } x = 2, \\ 3x - 2, & \text{if } x > 2. \end{cases}$$

Choose the value L so that f is continuous at $x = 2$. State your choice for L clearly and justify suitably.