Quiz 2
MA 123, Ivan Zaigralin

This quiz is closed-books and closed-notes. No calculators or cellphones are allowed. There are 6 problems, all together worth 10 points.

Problem 1 (1 point)**.** State the informal definition of the limit, that is, define what it means when we write

$$\lim_{x \to a} f(x) = L.$$

Problem 2 (1 point)**.** Define what it means for a function $f(x)$ to be continuous at a point a. Define also what it means for $f(x)$ to be continuous on an interval (a, b).

Problem 3 (2 points)**.** Sketch the graph of a function $f(x)$ which satisfies all of the following conditions:

- $\lim_{x \to -\infty} f(x) = -2$,
- $\lim_{x \to \infty} f(x) = 0$,
- $\lim_{x \to -3} f(x) = \infty$,
- $\lim_{x \to 3^-} f(x) = -\infty$,
- $\lim_{x \to 3^+} f(x) = 2$.

Problem 4 (2 points). Find $\lim_{x \to 4^+} \dfrac{4-x}{|4-x|}$

Problem 5 (2 points). Find $\lim_{x \to 9} \frac{\sqrt{x}}{(x-9)^4}$

Problem 6 (2 points). Find $\lim_{x \to \infty}(\sqrt{x^2+4x+1}-x)$