# MATH 111-007 QUIZ 10

**Instructions**: there are a total of **three** problems and one bonus.

**Problem 1.** (2 points a piece) Evaluate the following limits.

(1) $\lim_{x \to 1} \frac{5x^4 - 4x^2 - 1}{10 - x - 9x^3}$.

(2) $\lim_{\theta \to \frac{\pi}{2}} \frac{\sin \theta - 1}{\theta - \pi}$.

**Problem 2.** (3 points) A rectangular garden is to be constructed using a rock wall as one side of the garden and wire fencing for the other three sides. Given 100 ft of wire fencing, determine the dimensions that would create a garden of maximum area. What is the maximum area?

**Problem 3.** (3 points) Use Newton's method to find $4^{\frac{1}{3}}$ by estimating the zeros of $f(x) = x^3 - 4$. Start with $x_0 = 1$ and find $x_2$, that is, iterate the Newton's method formula twice.

**Problem.** (Bonus, 2 points) Consider the taxicab distance between the seats in the current classroom. In other words, seats <u>one unit distance</u> away from you only include those that are exactly one seat to your left, right, up and down. Write down the names of the students who are sitting <u>less or equal to</u> **two units** away from you. (Extra 1 point if you can present the names visually to showcase the distance)