Math 1A Sections 308-309
Worksheet 9: November 9,2009

Warm-up Questions - work by yourself or with a neighbor

1. Find the dimensions of the rectangle of largest area that can be inscribed in an equilateral triangle of side L if one side of the triangle lies on the base of the triangle.

2. Use one iteration of Newtons method applied to the initial approximation $x_1 = 2$ to find $36^{1/5}$ correct to two decimal places. (Actual Final Exam Question!)

Optimization Problems

1. Find a positive number such that the sum of the number and its reciprocal is as small as possible.

2. Find the point on the line $y = 4x + 7$ that is closest to the origin.

3. A 10m long piece of wire is cut into 2 pieces. One is bent into a square and the other into an equilateral triangle. How long should each of the two pieces be so as to minimize the total area of the two shapes?

Newton's Method Problems

1. Use Newtons method to approximate $\sqrt[4]{78}$ Hint: What is a fourth power that is close to 78?

2. Explain why Newtons method does not work for nding the root of the equation $x^3 - 3x + 6 = 0$ if the initial approximation is chosen to be $x_1 = 1$. (Actual Final Exam Question!)

3. Use Newton's Method to approximate $e^{0.1}$. Is this method any different from linear approximation?