Math 213: Mock Final

December 15, 2009

YOUR NAME:

YOUR TA's NAME AND SECTION NUMBER:

Prob 1 /20	
Prob 2 /20	
Prob 3 /20	
Prob 4 /20	
Prob 5 /20	
TOTAL /100	

1. (20 points) Find positive numbers x and y, whose sum is 75, such that xy^2 is maximized.

2. (20 points) Find the Taylor series of the function

$$f(x) = \ln(1 - 5x)$$

and find its radius of convergence.

3. (20 points) The rate of a continuous money flow starts at \$1000 and increases exponentially at 5% per year for 3 years. Find the accumulated amount of money flow if the interest earned is 11% compounded continuously.

4. (20 points) Consider the differential equation

$$\frac{dy}{dx} - 2xy - 4x = 0; \qquad y(1) = 20.$$

a) Solve this differential equation.

b) Apply one step of Euler's method with step size 0.1 to approximate the value of y at $x = 1.1$.

5. (20 points) Compute the following limit:

$$\lim_{x \to 0} \frac{5e^x - 5}{x^3 - 8x^2 + 7x}$$