Math 242,   Exam 3,   Fall 2016

Write everything on the blank paper provided. **You should KEEP this piece of paper.** If possible: return the problems in order (use as much paper as necessary), use only one side of each piece of paper, and leave 1 square inch in the upper left hand corner for the staple. If you forget some of these requests, don't worry about it – I will still grade your exam.

The exam is worth 50 points. Please make your work coherent, complete, and correct. Please $\boxed{CIRCLE}$ your answer.

No Calculators or Cell phones.

(1) (12 points) The acceleration of a car is proportional to the difference between 250 ft/sec and the velocity of the car. If this car can accelerate from 0 to 100 ft/sec in 10 seconds, how long will it take for the car to accelerate from rest to 150 ft/sec?

(2) (12 points) Consider the initial value problem $\frac{dy}{dx} = x+y^2$, $y(1) = 2$. Use Euler's method to approximate $y(12/10)$. Use two steps, each of size $1/10$.

(3) (13 points) Solve the Initial Value Problem

$$\begin{cases} y'' - 2y' + y = 2e^x \\ y(0) = 2, \quad y'(0) = 4. \end{cases}$$

Please check your answer.

(4) (13 points) Find the general solution of $xy' + 4y = x^3$. **Please check your answer.**