

**Math 242, Exam 3, Spring 2017, 1:15 Class**

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. Each problem is worth 10 points. Please make your work coherent, complete, and correct. Please CIRCLE your answer. Please **CHECK** your answer whenever possible.

The solutions will be posted later today. The exams will be returned in class on Thursday, March 30.

**No Calculators or Cell phones.**

- (1) State the Existence and Uniqueness Theorem for second order linear Differential Equations.
- (2) Find the general solution of  $\frac{dy}{dx} + \frac{y}{x} = y^2$ .
- (3) Find the general solution of  $y'' - 4y' + 13y = 0$ .
- (4) Find the general solution of  $y'' + y' - 2y = e^x$ .
- (5) Solve the initial value problem  $y'' - y = 12e^{3x}$ ,  $y(0) = 1$ ,  $y'(0) = 9$ .