

Name: \_\_\_\_\_

Lecture Section \_\_\_\_

Lecturer \_\_\_\_\_

**Ma 221**

**Exam II A**

**15S**

**You may not use a calculator, cell phone, or computer while taking this exam. All work must be shown to obtain full credit. Credit will not be given for work not reasonably supported. When you finish, be sure to sign the pledge.**

Note: A table of selected integrals appears on the last page of this exam.

Score on Problem #1a \_\_\_\_\_

#1b \_\_\_\_\_

#1c \_\_\_\_\_

#2 \_\_\_\_\_

#3 \_\_\_\_\_

#4 \_\_\_\_\_

Total Score \_\_\_\_\_

I pledge my honor that I have abided by the Stevens Honor System.

\_\_\_\_\_

Name: \_\_\_\_\_ Lecture Section \_\_\_\_

**1. (30 pts. total)** Consider the differential equation

$$L[y] = y'' + 4y' + 4y = 12e^{-2x} + 8x^2$$

**1 a (6 pts.)** Find a general solution of the corresponding homogeneous equation

$$L[y] = 0.$$

**1 b (20 pts.)** Find a particular solution of the equation.

Name: \_\_\_\_\_ Lecture Section \_\_\_\_

**1 c (4 pts.)** Give a general solution of the equation

$$L[y] = y'' + 4y' + 4y = 12e^{-2x} + 8x^2$$

Name: \_\_\_\_\_ Lecture Section \_\_\_\_

**2 (25 pts)** Find a particular solution of the differential equation

$$y'' - y' - 2y = 36te^{-t}$$

Name: \_\_\_\_\_ Lecture Section \_\_\_\_

**3 (25 pts.)** Find a general solution of the differential equation

$$y'' - 2y' + y = \frac{1}{x}e^x, \quad x > 0$$

Name: \_\_\_\_\_ Lecture Section \_\_\_\_

**4 (20 pts.)** Find a general solution of the differential equation

$$x^2 y'' + 5xy' + 5y = 0$$

**Table of Integrals**

$$\int \ln t dt = t(\ln t - 1) + C$$

$$\int t \ln t = \frac{1}{2} t^2 \ln t - \frac{1}{4} t^2 + C$$

$$\int (\ln t)^2 dt = t(\ln^2 t - 2 \ln t + 2) + C$$

$$\int \frac{\ln t}{t} dt = \frac{1}{2} \ln^2 t + C$$

$$\int \frac{(\ln t)^2}{t} dt + C = \frac{1}{3} \ln^3 t + C$$

$$\int \frac{1}{t \ln t} dt = \ln(\ln t) + C$$