Name:_____   Lecture Section _____

Lecturer_____

Ma 221   Exam II B   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.

_____

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

$$L[y] = y'' - 4y' + 4y = 12e^{2x} + 16x^2$$

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.

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

$$L[y] = y'' - 4y' + 4y = 12e^{2x} + 16x^2$$

2 (25 **pts**)   Find a particular solution of the differential equation
$$y'' + y' - 2y = 18te^t$$

3 $\left(25\ \textbf{pts.}\right)$ Find a general solution of the differential equation

$$y'' - 2y' + y = \frac{3}{x}e^x\,, \qquad x > 0$$

4 $\left(20\ \textbf{pts.}\right)$ Find a general solution of the differential equation

$$x^2 y'' - 3xy' + 5y = 0$$

Table of Integrals

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

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

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

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

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

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