Ma 221   Exam II A   10S

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

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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 _____

                #2a _____

                #2b _____

                #2c _____

                #3 _____

Total Score   _____

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

$$y'' - y' - 2y = 2e^{2t} - 20\sin 2t$$

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

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

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

2 (40 **pts**. **total**)   Consider the Initial Value Problem
$$t^2 y'' - t y' + y = t \quad y(1) = 1 \quad y'(1) = 4$$

2a (**5 pts**.)   Find a homogeneous solution to this differential equation.

2b (**25 pts**.)   Find a particular solution of this differential equation.

2c (**10 pts**.)   Find the solution to this Initial Value Problem given above.

3 (**30 pts**.)   Find a general solution of

$$y'' + y' = 6x^2$$

Table of Integrals

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

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

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

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