Math 3200 (Elementary Differential Equations) **Fall 1994**

Instructor: Leopoldo P. Franca

NAME: _____

FINAL:

Please show all your work in the test. Guessed answers are NOT acceptable. Open book. You may use calculators. Good luck!

(25 pt) 1) Solve:

$$t\frac{dx}{dt} + 2x = 4e^t\,, \qquad t > 0$$

(25 pt) 2) Solve:

$$y' = \frac{4(x-1)^3}{y}, \qquad y > 0$$

$$y(1) = 3$$

(25 pt) 3) Give the general solutions of:

a) $y'''' - 16y = 0$

b) $y'''' + 2y'' + y = 0$

(25 pt) 4) Find the solution of

$$y'' - y = e^x$$

$$y(0) = 1, \quad y'(0) = 3/2$$

(25 pt) 5) Find the general solution of

$$y'' + 4y' + 4y = \frac{e^{-2x}}{x^2}$$

(25 pt) 6) Solve using the Laplace transform technique

$$y'' - y = u(t-1)$$

$$y(0) = 2, \quad y'(0) = 0$$

(25 pt) 7) Find two linearly independent power series solutions about $x = 0$ for

$$y'' + 2xy' + 4y = 0$$

(25 pt) 8) Solve the system of differential equations

$$x_1' = 2x_1 + 4x_2$$

$$x_2' = -4x_1 - 6x_2$$