MATH 23 - DIFFERENTIAL EQUATIONS, SPRING 2011
MIDTERM

Your Name:

Your Section:

(1) Solve the following differential equation and answer the question.
$y'(t) = ty + t + y + 1$, $y(0) = 0$
For what initial values of (t, y) is there a unique solution?

(2) Solve the following differential equation.

$$y'(x) = \frac{(-2x\ln(y) - e^x)}{(x^2 y^{-1} + 2y)}$$

$$y(0) = 1$$

(3) Solve the following inhomogeneous differential equation. Give the general solution in terms of real valued functions and then the solution for the initial conditions given. Hint: $(-1) + 6 + 12(-1) + 7 = 0$

Solve $y''' + 6y'' + 12y' + 7y = 14$

$y(0) = 3,\ y'(0) = -1,\ y''(0) = 1$

(4) Consider the system:
$$x'(t) = 5x + 3y + z$$
$$y'(t) = 5y + z$$
$$z'(t) = 7z$$
Write the system in matrix form and solve the resulting system.