

Test Total

Name \_\_\_\_\_

**Test 2 Ordinary Differential Equations 3450:335 Dr. Norfolk April 10, 2009**

Show all of your work and explain your reasoning.

1. Find the general solution to  $\frac{d^2y}{dx^2} - 5 \frac{dy}{dx} - 14y = -45e^{-2x} - 18 - 19x - 7x^2$ .

16 points

2. Find the general solution to  $y'' + 9y = \sec(3x)$ .

16 points

3. Given  $y = x$  is a solution of  $x^3y'' + xy' - y = 0$ , find the general solution of this differential equation.

16 points

4. A solution to  $x^2y'' + 2xy' - 2y = 6x + 4x^2$  is  $y = 2x \ln x + x^2$ .  
A solution to  $x^2y'' + 2xy' - 2y = 3x + 12x^2$  is  $y = x \ln x + 3x^2$ .  
Find the general solution to  $x^2y'' + 2xy' - 2y = 15x + 20x^2$ .

16 points

5. Find the general *real* solution to the system of equations:  $\begin{cases} \frac{dx}{dt} = x - 2y \\ \frac{dy}{dt} = x + 3y \end{cases}$ .

16 points