

Millersville University  
Department of Mathematics  
MATH 365, *Ordinary Differential Equations*, Homework 07  
March 11, 2009

Name \_\_\_\_\_

Please answer the following questions. Answers without justifying work will receive no credit. Partial credit will be given as appropriate, do not leave any problem blank. Each problem is worth 10 points. Your completed assignment is due at class time on Friday, March 12, 2009.

1. Find the general solutions to the following ordinary differential equations. Use variation of parameters to determine the particular solutions.

(a)  $y'' + y' - 2y = 2 \ln t$

$$(b) \ y'' - 4y' + 4y = \frac{1}{2}\sqrt{t}$$

(c)  $y'' - y = e^{-t^2}$

2. Find the solution to the initial value problem below.

$$\begin{aligned}y'' + a^2y &= F(t) \\y(0) &= 0 \\y'(0) &= 0\end{aligned}$$

Assume that  $a > 0$  is a constant and that  $F(t)$  is a continuous function.

3. Consider the nonhomogeneous second order linear ODE below.

$$t^2y'' - 2ty' + 2y = te^{-t}$$

Show that  $y_c(t) = c_1t^2 + c_2t$  is a complementary solution to the equation. Use variation of parameters to find the general solution.