

Millersville University
Department of Mathematics
MATH 365, *Ordinary Differential Equations*, Homework 5
February 27, 2004

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 Wednesday, March 3, 2004.

1. Solve the following ordinary differential equations and initial value problems.

(a) $y'' - 10y' + 25y = 0$

(b) $y'' - 4y' + 4y = 0$; $y(0) = 1$, $y'(0) = -1$

2. Find a second order initial value problem (an ordinary differential equation and a set of initial conditions for $t = 0$) for which the following functions are solutions.

(a) $y(t) = e^t - te^t$

(b) $y(t) = 1 + e^{-3t}$

(c) $y(t) = e^{2t} \sin 3t$

3. Use reduction of order to find a second linearly independent solution to the equation

$$ty'' - (t + 1)y' + y = 0$$

assuming that $y_1(t) = e^t$ is a solution.