

Millersville University
Department of Mathematics
MATH 365, *Ordinary Differential Equations*, Homework 08
March 30, 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 Wednesday, April 1, 2009.

1. Solve the following differential equation by means of a power series solution centered at $t_0 = 0$. Clearly state the recurrence relation, find at least the first four terms in each of two linearly independent solutions, and if possible find the general term in each solution.

$$y'' + t y' + 2y = 0$$

2. Solve the following differential equation by means of a power series solution centered at $t_0 = 1$. Clearly state the recurrence relation, find at least the first four terms in each of two linearly independent solutions, and if possible find the general term in each solution.

$$t y'' + y' + t y = 0$$

3. Solve the following differential equation by means of a power series solution centered at $t_0 = 0$. Clearly state the recurrence relation, find at least the first four terms in each of two linearly independent solutions, and if possible find the general term in each solution.

$$(1 + t^2)y'' - 2ty' + 3y = 0$$

4. Solve the following differential equation by means of a power series solution centered at $t_0 = 0$. Clearly state the recurrence relation, find at least the first four terms in each of two linearly independent solutions, and if possible find the general term in each solution.

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