Name: _____ **ID Number:** _____

TA: _____ **Section Time:** _____

MTH 235
Exam 2
March 2, 2010
50 minutes
Sects: 3.1-3.6, 5.2, 5.4, 5.5.

No notes. No books. No Calculators.
If any question is not clear, ask for clarification.
No credit will be given for illegible solutions.
If you present different answers for the same problem, the worst answer will be graded.
Show all your work. ***Box your answers.***

1. (15 points) Find the solution to the initial value problem

$$y'' + y' - 6y = 0, \qquad y(0) = 3, \qquad y'(0) = -4.$$

2. (21 points) Find the indicial equation and the recurrence relation for the coefficients of a power series solution near the regular singular point $x_0 = 0$ to the equation

$$2x^2\,y'' + 3x\,y' + \left(2x^2 - 1\right) y = 0.$$

Also find the first three terms of a power series solution y.

3. (17 points) Find a particular solution to the non-homogeneous equation

$$t\,y'' - (1+t)\,y' + y = t^2 e^{2t},$$

knowing that $y_1(t) = (1+t)$ and $y_2(t) = e^t$ are solutions to the homogeneous equation.

4. (17 points) Find the general solution to the differential equation

$$y'' - 6y' + 9y = 2e^{3t}.$$

5. (15 points) Find real-valued fundamental solutions to the differential equation

$$y'' + 2y' + 10y = 0.$$

6. (15 points) Find real-valued fundamental solutions arbitrary close to the point $x_0 = -1$ of the differential equation

$$(x+1)^2\, y'' + 3(x+1)\, y' + 5y = 0, \qquad x \neq -1.$$

#	Pts	Score
1	15	
2	21	
3	17	
4	17	
5	15	
6	15	
Σ	100	