| MATH 250 Exam #1 Fall 2006 | **DO NOT WRITE ON THIS PAPER** except in the name box. For each problem, **show all work** on the blank paper provided. | **Name:** |

Prob. Num.	Point Value	Points Given
1a	10	
1b	10	
2	20	
3	20	
4	20	
5	20	
6	20	
Total	120	
Curve		
Grade		

1) Classify each as an ordinary or partial differential equation, give the order, and indicate the independent and dependent variables. If the equation is an ODE, state whether it is linear or nonlinear.

a. $\sqrt{1-y}\,\dfrac{d^2y}{dx^2} + 2x\dfrac{dy}{dx} = 0$

b. $8\dfrac{d^4z}{dw^4} = w(1-w)$

2) Determine for which values of m the function $\varphi(x) = x^m$ is a solution to the equation $3x^2\dfrac{d^2y}{dx^2} + 11x\dfrac{dy}{dx} - 3y = 0$.

3) Is $y = 3\sin 2x + e^{-x}$ a solution to $\dfrac{d^2y}{dx^2} + 4y = 5e^{-x}$?

4) Use Euler's Method with step size h = 0.1 to approximate the solution to the initial value problem $y' = x - y^2$, $y(1) = 0$ at the points x = 1.1, 1.2, 1.3, and 1.4.

5) Solve $\dfrac{dx}{dt} = 3xt^2$

6) Solve the initial value problem $\dfrac{dy}{dx} = 2x\cos^2 y$, $y(0) = \pi/4$.