

**MAT 250 Final
Spring 2003**

DO NOT WRITE ON THIS PAPER (except in the name box to the right). Show **all** work on blank paper provided. Points may be deducted for insufficient work even if correct answers are given.

Name:

Prob. Num.	Point Value	Points Given	
1	10		1) Use Euler's Method to approximate the solution to $dy/dx = 2x + y$, $y(0) = 1$ at points $x = 0.1, 0.2, 0.3, 0.4, 0.5$ using steps of size 0.1.
2	10		2) Find the general solution to the equation $\frac{dy}{dx} + \frac{3y}{x} + 2 = 3x$.
3	10		3) Solve $\frac{dy}{d\theta} = \frac{\theta \sec(y/\theta) + y}{\theta}$.
4	10		4) If initially there are 300 g of a radioactive substance and after 5 years there are 200 g remaining, how much time must elapse before only 1 g remains?
5	10		5) Find a general solution to $y^{iv} + 13y'' + 36y = 0$. (Hint, if needed: solve the characteristic equation for r^2 using the quadratic formula, then solve for r itself. All four solutions will be imaginary.)
6	10		6) Find the solution to the initial value problem $y'' + 2y' + y = 2\cos\theta$, $y(0) = 3$, $y'(0) = 0$.
7	10		7) Solve the initial value problem for $y(t)$ using the method of Laplace transforms: $y''' + 4y'' + y' - 6y = -12$, $y(0) = 1$, $y'(0) = 4$, $y''(0) = -2$.
8	10		8) Find the first four nonzero terms in the Taylor polynomial approximation for the initial value problem $y' = 2xy - y^2$, $y(0) = 3$.
9	10		9) Find at least the first four nonzero terms in a power series expansion about $x = 0$ for a general solution to $(2x - 3)y'' - xy' + y = 0$.
Total	90		
Adj.			
Grade			