Math 221 Quiz 4 **Fall '06**

Name:_____ Score:_____

Instructions: You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

1(8pts) (a) Let $u_h(t)$ be a solution to the homogeneous linear equation $u' = p(t)u$ and $u_p(t)$ be a solution to the nonhomogeneous linear equation $u' = p(t)u + q(t)$. Show that $u(t) = u_h(t) + u_p(t)$ is a solution to the nonhomogeneous linear equation. This result is called the Superposition Principle.

(b) Does the Superposition Principle hold for nonlinear equations such as $u' = p(t)u^2 + q(t)$?

2(7pts) Use Euler's method to approximate the solution of the initial value problem $u' = 2t - u, u(0) = 1$ in the time interval $[0, 1]$, at five equally paced points. **Sketch the approximating solution.**

END