

Fall 2006
MATH2243: Linear Algebra and Differential Equations
Quiz #1 (9/14/2006)

Name: _____ ID: _____ Section: _____

Direction: Show your work in the space provided. Partial credit will be given. This is a closed-book test. No crib sheets or calculators are allowed. You have 10 minutes to finish the quiz. Good luck!!

1. (12 points) Identify a differential equation, an initial condition and a function. Verify that the given function satisfies both the differential equation and the initial condition.

- | | | |
|----|-------------------------|-----------------------|
| 1) | $y = t + t^2 + 2e^{2t}$ | function |
| 2) | $y' = 2y + 1 - 2t^2$ | differential equation |
| 3) | $y(0) = 2$ | initial condition |

Verify the initial condition.

$$y(0) = 0 + 0^2 + 2e^{2(0)} = 0 + 0 + (2)(1) = 2 \quad \text{OK}$$

Verify the solution.

$$\begin{aligned} y'(t) &= (t + t^2 + 2e^{2t})' \\ &= 1 + 2t + 4e^{2t} \\ &= 1 + 2(t + t^2 + 2e^{2t}) - 2t^2 \\ &= 1 + 2y - 2t^2 \end{aligned} \quad \text{OK}$$

The given function $y(t)$ satisfies both the differential equation (2) and the initial condition (3).