Due September 15, 2010

MTH 2140 Quiz 1

Instructions: This is a self-scheduled quiz. You can work for as long as you like, but you can't take breaks. You are not allowed to work in groups or discuss problems with other people and you are not allowed to use notes, books, web browsers, calculators, etc. Please place the quiz in my mailbox (in MH250) or in the box outside of my office (MH 257) sometime before Wednesday at 5 PM.

1. Solve the following initial value problem:

$$\begin{cases} \dot{y} = \frac{y^2}{t+1} \\ y(3) = 2 \end{cases}$$

2. Suppose that $y(t) = t^4 + t^2$ solves $\dot{y} = f(t, y)$ and assume that both f and $\frac{\partial f}{\partial y}$ are continuous functions (this implies that f is Lipschitz on closed intervals of y). For each of the following say whether or not it can be a solution. Please give an explanation.

   (a) $y(t) = 2t^4 + t^2 + 1$

   (b) $y(t) = t^2$