Midterm Exam I

1	2	3	4

Last Name:_____

First Name:_____

ID:_____   Section:____

Math 2243,
February 16, 2004

There are 4 partial credit questions, each of them worth 25 points.
NO GRAPHIC CALCULATORS are permitted. GOOD LUCK !

1. Answer both of the following two questions :

a) Verify if the Picard conditions are satisfied for the following initial value problem: $y' = t^y,$ and $y(2) = 1$. (**20 pts.**)

b) Construct(if possible!) a differential equation that has at least one equilibrium of each type(sink,node and source).Draw the phase-line for this equation. (**5 pts.**)

2. A certain radioactive substance has a half-life of 5 hours. Find the time for a given amount to decay to one-tenth of its original mass.

3. John and Maria are having dinner, and each orders a cup of cofee. John cools his cofee with some cream. They wait 10 minutes and then Maria cools her cofee with the same amount of cream. The two begin to drink. Who drinks the hotter cofee? (Explain carefully what is your theory!!)

4. Solve the first-order differential equation (*by the method you prefer!*):

$$y' - y = 1.$$