Your Name: **SCORE:**   **/10**

INSTRUCTIONS: Answer the following short-answer questions (in 10 minutes).
GOAL: This reading quiz is designed to illuminate your understanding of the concepts in the second half of the first Chapter of the book: Existence and Uniqueness Theorem, Phase Lines, Equilibria, Bifurcations, Linear Equations, and Integrating Factors.

1. (*2 points.*) In order for a solution to $y' = f(t, y), \qquad y(t_0) = y_0$ to exist AND be unique what conditions must hold?

2. (*2 points.*) In your own words, explain what happens at a bifurcation value.

3. (*2 points.*) Draw the bifurcation diagram for the following DE $y' = ry$ where r is a parameter. Clearly indicate the stable and unstable sections of the curve and the bifurcation value. (You can use the back of this sheet)

4. (*2 points.*) Write down an example of an autonomous DE that has no equilibria. (Is that possible?)

5. (*2 points.*) What is the integrating factor $\mu(x)$ that you would have to multiply the DE $y' = -3y \ln(x) + 1$ by in order to obtain a general solution?

BONUS (*2 points.*) Comment on the pace of the class. Is it going too fast, too slow or "just right"? What is the concept you think that you least understand in these sections of the text?