Homework 2

Due: Friday, September 25

1. p. 79, problems 3.1.1 and 3.1.3. (There may be several values of r at which saddle-node bifurcations occur. For problem 3.1.3, you may need to find a calculus book to refresh your basic curve sketching skills a little bit.)

2. p. 79, problem 3.1.5. (Don't be intimidated. The correct answers are a bit degenerate, especially the "bifurcation diagram" in part b.)

3. p. 80, problems 3.2.1 and 3.2.2.

4. p. 81, problem 3.3.1, a-c. In part b), stop and think about why the formula for p_c makes physical sense. p_c is the threshold pump strength past which you get a laser beam. How should that threshold depend on the rate at which you lose photons, the gain coefficient for stimulated emission, and the time rate of spontaneous emission?

It is intentional that none of these problems have any stars.