MATH 489 **Homework 10** **SPRING 2007**

Problem # 1. Give an example of a phase portrait where there is an orbit whose ω limit set is non-compact. (You do not have to write the equations. Just sketch the phase portrait.)

Problem # 2. Find the ω-limit sets of the orbits of

$$\dot{r} = r(r-1)(r-3), \quad \dot{\theta} = 1$$

with initial conditions $(0,0), (1/2,0), (1,0), (2,0)$.

Problem # 3. Describe ω-limit sets for all initial conditions for the system

$$\dot{x} = x^3, \;\; \dot{y} = -y^3.$$