Math C13-1 Test 10/27/92 C. Robinson

Closed book. You may use hand calculators.

Original test had four problems, but the other two are not appropriate for the course in 1999.

1. (30 Points) Let $f(x) = x^3 + \frac{8}{9}x$.
   a. Find the fixed points and classify them as attracting, repelling, or neither.
   b. Determine the phase portrait by means of graphical analysis (stair-step method). Give the basin of attraction for each of the fixed points.

3. (20 Points) Consider the map $F_\mu(x) = \mu x(1-x)$ for $\mu = 3.2$. It has a two cycle, $\{q_1, q_2\}$ where $q_1 = [\mu + 1 - (\mu^2 - 2\mu - 3)^{\frac{1}{2}}]/(2\mu) \approx 0.5130$ and $q_2 = [\mu + 1 + (\mu^2 - 2\mu - 3)^{\frac{1}{2}}]/(2\mu) \approx 0.7995$. Determine whether this two cycle is attracting or repelling. (Do more than just state the answer. You may use the approximate values of the points on two cycle as the actual values.)