316-QUIZ 13

Name:_____

May 12, 2003

(**1**) Rewrite the ODE

$$\frac{d^2x}{dt^2} + x - x^2 = 0$$

as a system of two first-order equations for x and $y = dx/dt$. Find all the equilibrium points of the system, give their type and stability and sketch the phase plane near each one.

(2) Consider the same ODE as in part (1):

$$\frac{d^2x}{dt^2} + x - x^2 = 0$$

Find expressions for the potential energy $G(x)$ and the total energy $E(x, x')$ for this system. Use the energy to complete the drawing of the phase plane for this equation.