PHYSICS 331 Advanced Classical Mechanics
Problem Set 6

Problem 1
Draw a phase diagram for a superball that you drop straight down on a hard floor. Label the dot on the diagram that corresponds to the initial conditions (i.e. when you dropped it), and include a diagram to represent the behaviour of the ball while it is bouncing. Draw a diagram for each of the following cases:

(a) the undamped case (assuming that the bouncing is perfectly elastic;

(b) the damped case.

What would your diagram look like if you dropped a book instead? Comment.

Problem 2
Thornton and Marion: Chapter 3, Problem 40.

Problem 3
Thornton and Marion: Chapter 3, Problem 45. Based on your value of Q, qualitatively sketch the graphs of amplitude as a function of driving frequency and phase shift as a function of driving frequency. Compare them to the undamped case in each of your sketches.

Other Things
Don't forget that you have a journal assignment as well. Submit your comments about the reading via email. Mention what parts you understand, what parts you don't, what seems interesting to you–and what doesn't, along with any other comments that you feel are relevant for the reading. Focus your comments on the reading from sections 4.1–4.3.