For full credit, solve the problem completely by showing all of your work and provide the correct numeric solution.

I. A Downy ball which can be modeled as a sealed, spherical shell of diameter *d* is rotating with constant angular velocity in a clothes washing machine. Assume that the Downy ball is confined circular path that undergoes no rotations in a plane perpendicular to the angular momentum vector. The sphere is nearly filled with a fluid having uniform density ρ, and also contains one small bubble of air at atmospheric pressure. Your answer should be a function of variables and constants. Assume that the diameter of the sphere is d and the radius of motion is R.

a) Determine the pressure *P* at the center of the sphere
b) The bubble has an initial position directly above the center of the sphere. Where is the bubble, relative to its original position, after the washing machine starts to spin? (Is it closer to the center of the washing machine or further away)

For full credit, solve the problem completely by showing all of your work and provide the correct numeric solution.

II. A block of mass *m* is connected to two springs of force constants k_1 and k_2. The block moves on a frictionless table after it is displaced from equilibrium a distance d and released. Find the period of the motion T.