Ch. 11 Worksheet

1. A woman stands on a platform with a diameter D_1 that acts as a piston. The combined mass of the woman and the piston is 75 kg. The piston pushes downward on a reservoir of oil that supports a second platform with a diameter D_2 on which 12 women are standing. The combined mass of the second platform and the 12 women is 780 kg. Both platforms are at the same height during this demonstration; and they are at rest. What is the ratio D_2/D_1?

2. A spring of spring constant 3.00×10^4 N/m is between a rigid beam and the output piston of a hydraulic lever. An empty container with negligible mass sits on the input piston. The input piston has area A and the output piston has area $18A$. Initially the spring is at its rest length. How many kilograms of sand must be slowly poured into the container to compress the spring 5.00 cm?

3. A hollow sphere of inner radius 8.0 cm and outer radius 9.0 cm floats half-submerged in a liquid of density 800 kg/m^3. What is the mass and density of the sphere?