

DAY 22

Homework Assignment (see syllabus for homework collection information)

1. Derive the equation

$$V_i/V_{tot} = \rho_{object} / \rho_{fluid}$$

2. What is the maximum thickness a steel sphere of radius R can have and still float on the surface of water?

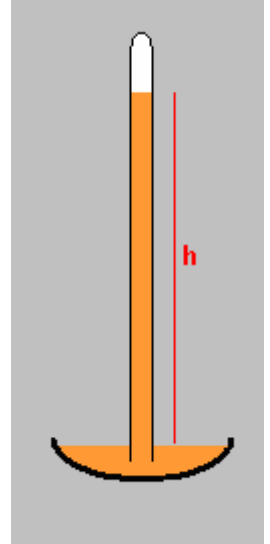
Find the mass of such a sphere for
 $R = 2$ m and $R = 4$ m.

3. A precise *barometer* can be constructed as shown at left. A tube full of some liquid is inverted in a pool of that liquid. The fluid settles into equilibrium, with a vacuum above the fluid. The height of the column of fluid indicates the atmospheric pressure.

Calculate what h will be for standard atmospheric pressure at sea level if the liquid in the barometer is

- a) Mercury
 - b) Water
 - c) Alcohol
4. In an IV, pressure to insure delivery of the contents of the IV into the bloodstream is provided by elevating the fluid in the IV above the arm. What pressure is present if an IV bag is 3 ft above the patient's arm and the fluid in the IV has the density of water?
 5. A 100 ft tall water tower sits atop a 50 ft tall hill. What is the fluid pressure (in psi) at the faucets in the town below that are fed by this water tower?
 6. A rowboat measures 4 ft wide by 10 ft long. How much (in inches) will the boat sink into the water when two 200 lb men get into the boat?
 7. Make a rough sketch of what the graph of P vs. height measured from the bottom of the ocean looks like. Now make rough sketch of what a graph of P vs. height measured from the bottom of the Earth's "ocean of air" (in other words, height measured from the ground) looks like.

HINT - air is compressible, water is not.



<http://www.alaskaems.org/student/academy/intravenous.htm>