

Homework 1

Due Sept 15.

(1) A tire is filled to 32 psig (32 lbf/in² above atmospheric pressure). If the tire is a sea level (and 65 degrees F) and has a volume of 3 ft³ what is the total weight of the air in the tire (in kg).

(2) A small village draws 1 acre ft/day of water from its reservoir. What is this in liters per second?

(3) (a) list three liquids (make them different from everyone else's). (b) Determine their densities (in kg/m³). (c) Determine their kinematic viscosities (in metric units)

(4) A regular scuba tank holds 10 L of air at a pressure of 300 bar. The potential energy of that compressed gas is the pressure times the volume. (a) How many Joules are in a scuba tank? (b) If you manage to convert all that energy to kinetic energy ($\frac{1}{2}mv^2$) how fast could you make a tennis ball (0.1 kg) go (in m/s)?

(5) List a non-Newtonian fluid that you own.

(6) What is the speed of sound in (a) room temperature and pressure Helium, (b) in gasoline? (in m/s).

(7) What is the gage pressure at the bottom of a 3m deep pool (in atm)? (Hint: Start reading Chapter 2).