Review assignment #2 due 7/8/02

chapter 10: 1, 4, 7, 8, 12, 16, 19, 22, 26, 30, 31, 35, 36, 45

chapter 11: 6, 7, 9-15

chapter 10

10.1 (a) the force exerted by both objects A & B is the same, their "footprints" differ. A has a smaller footprint and exerts more pressure.

(b) pressure (Pa) = Force (N)/area (m^2) & Force = mg = 1kg · 9.81 N/s^2 = 9.81 N

for A: pressure = $\frac{9.81\,N}{1\,m^2}$ = 9.81 Pa for B: P = $\frac{9.81\,N}{10\,m^2}$ = 0.981 Pa

10.4 area of a circle = πr^2 & diameter = 2(radius)

so force = pressure × area = $(1.01325\times10^5\,Nm^{-2})\,\pi\,(5.00\times10^{-3}\,m)^2$ = 7.96 N

10.7 a barometer: a column of mercury is inverted into a dish of mercury. A vacuum forms at the top and the but the mercury doesn't all flow out. Rather, it is pushed up by the pressure of the atmosphere on the dish.

The mercury is pushed up 760 mm. This is many orders of magnitude less high than the miles of air pushing down on the dish. This is because mercury has a much greater density than air.

10.8 density of Hg: $P = \rho g h$ so $\rho = \frac{P}{gh}$

$$\rho = \frac{P}{g\times h} = \frac{1.01325\times10^5\,kg\,m^{-1}\,s^{-2}}{(9.81\,m\,s^{-2})(0.760\,m)} = 1.36\times10^4\,kg/m^3$$

convert to g/cm^3: $1.36\times10^4\,kg/m^3 \times \frac{1000\,g}{1\,kg} \times \left(\frac{1\,m}{100\,cm}\right)^3 = 13.6\,g/cm^3$