Hw 1.2

3.6 The value for the abs pressure will always be greater than that for the gage pressure

statement is true

$P_{gage} = P_{abs} - P_{atm}$ - gage pressure

$P_{abs} = P_{atm} + P_{gage}$ - absolute pressure

Therefore, $P_{abs} > P_{gage}$

3.7 As long as you stay on the surface of Earth, the atmospheric pressure will be 14.7 psia

False,

The atmospheric pressue within Earth's surface is 13.8 to 15.5 psia

3.8 The pressure in a certain tank is -55.8 Pa(abs)

False, -55.8 Pa(abs) means below atmospheric press in the gage pressure

3.9 The pressure in a certain tank is -55.8 Pa(abs)

True

10) The answer is false. Because it is negative as when it is alone atmomsphere it's positive

11) $W_{air} = 0.076\ lb/ft^3$

$h = 4000\ ft$

$P\Delta = (W)(h)$

$= (0.076\ lb/\cancel{ft^3})(4000\ \cancel{ft})$

$= 304\ \frac{lb}{ft^2} / 12$

$= 2.1\ Psia$

$P = 14.70 - 2.1$

$P = \boxed{12.6\ Psia}$

13) $P = F/A$

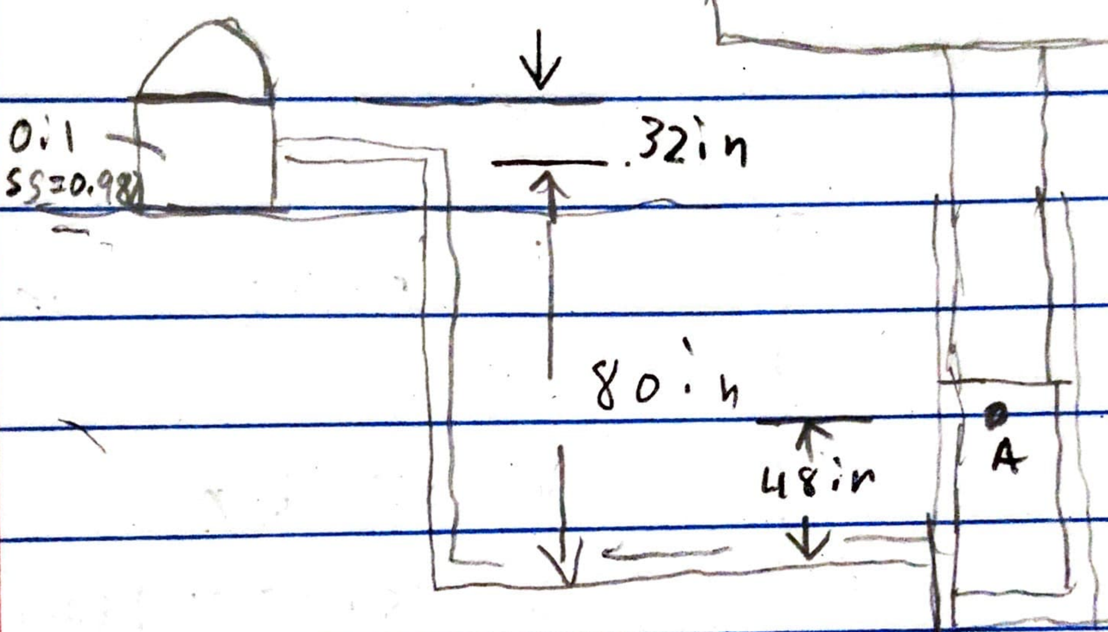
$D = 1080\ \frac{kg}{m^3}$

$P = (1080)(9.81)(0.550$

$= \boxed{5.83\ kPa}$

The ~~Physics~~ Problems we went over class consist of the Flow of Fluids, ~~and~~ Bernoulli's equation. and Pascal's Paradox. After solving one of the Pascal's Paradox practice problems, I learned ~~that~~ new formulas and how once I start at a certain liquid I can also start on the other side if it's the same liquid.

3.49



$SG_{oil} = 0.98$, $P_A \leq 180$ psig, P_{air}?

$P_{air} = \left[(32in)\left(\frac{1ft}{12in}\right) + (80in)\left(\frac{1ft}{12in}\right) - (48in)\left(\frac{1ft}{12in}\right)\right] 0.9$

$P_{air} = (2.67 + 5 - 4) 0.90 = (3.67) 0.90$

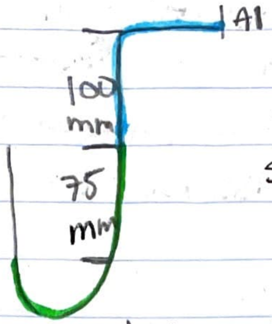
$P_{fluid} = 3.3$ psig

$P_{air} = P_A - P_{fluid} = 180 - 3.3 = 176.7$ psig

HW 1.2
62, 83, 90, 94

61

3.62 Water is in the pipe shown. Calculate the Pressure at point A in kPa (gage)



= Water

= mercury ($S_g = 13.54$)

or look in the appendix

$$S_g = \frac{\gamma_f}{\gamma_w} \quad 13.54 = \frac{\gamma_F}{9.81} = 132.8 \frac{kN}{m^3}$$

$$P_A + \gamma_w (100mm)(1m/1000mm) + \gamma_m (75mm)(1m/1000mm) = P_{atm}$$

$$P_A = -\left(9.81 \frac{kN}{m^3}(.1m) + 132.8 \frac{kN}{m^3}(.075m)\right)$$

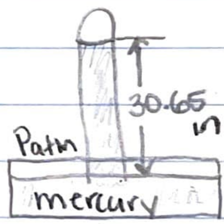
$$P_A = -10.94 \frac{kN}{m^2} \text{ or } -10.94 \text{ kPa}$$

3.83 A barometer indicates the atmospheric pressure to be 30.65 inches of mercury. Calculate the atmospheric pressure in psia.

$$844.9 \text{ lb/ft}^3 \rightarrow 0.489 \text{ lb/in}^3$$

$$P_{atm} = \gamma_m h \rightarrow 0.489 \text{ lb/in}^3 (30.65 in)$$

$$P_{atm} = 14.99 \text{ lb/in}^2 \text{ or } 14.99 \text{ psia}$$



3.90 The pressure in a vacuum chamber is -68.2 kPa. Express this pressure in mm Hg.

$$P = -68.2 kPa \times 1000 = -68200 Pa$$

* 1 Pa = .0075 mmHg

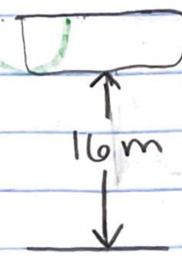
$$P = -68200(.0075)$$

$$P = -511.5 \text{ mmHg}$$

3.94 A passive solar water heater is to be installed on the roof of a multi-story building. The heater tank is open to atmospheric pressure & is mounted 16m above the ground level. In the static (non-flowing) state, what gage pressure, in kPa, must the plumbing line be designed to withstand if it is connected all the way down to ground level?

$h = 16\ m$

$\gamma = 9.81\ \frac{kN}{m^3}$



$\Delta P = h\gamma = 16m\left(9.81\ \frac{kN}{m^3}\right)$

$\Delta P = 156.96\ \frac{kN}{m^2}$ or 156.96 kPa