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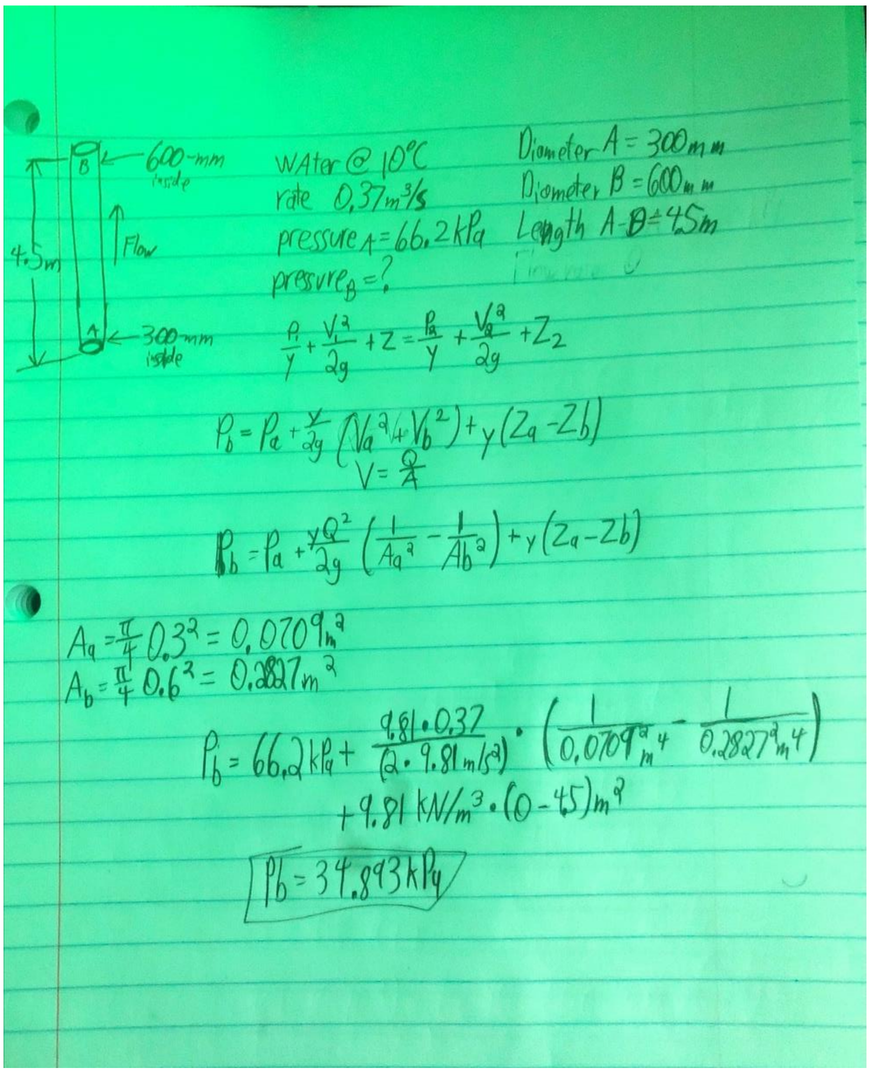
One of the most important things in fluid mechanics is to find the temperature of a substance because it affects the properties. The first thing to do in solving a Bernoulli's Equation is to pick a reference point. Typically, you pick the point with the most information given. However, when there is a when the fluid is flowing out of the system, the procedure is a little different. One thing I found interesting is when liquid leaves the system and goes into the atmosphere, it then has the same pressure as the atmosphere. It does not change, it remains constant.



Water @ 10°C
rate $0.37 m^3/s$
$pressure_A = 66.2 kPa$
$pressure_B = ?$

Diameter A = 300 mm
Diameter B = 600 mm
Length A-B = 4.5 m

$$\frac{P_1}{\gamma} + \frac{V_1^2}{2g} + z = \frac{P_2}{\gamma} + \frac{V_2^2}{2g} + Z_2$$

$$P_b = P_a + \frac{\gamma}{2g}(V_a^2 - V_b^2) + \gamma(Z_a - Z_b)$$

$$V = \frac{Q}{A}$$

$$P_b = P_a + \frac{\gamma Q^2}{2g}\left(\frac{1}{A_a^2} - \frac{1}{A_b^2}\right) + \gamma(Z_a - Z_b)$$

$$A_a = \frac{\pi}{4} 0.3^2 = 0.0709 m^2$$

$$A_b = \frac{\pi}{4} 0.6^2 = 0.2827 m^2$$

$$P_b = 66.2 kPa + \frac{9.81 \cdot 0.37}{(2 \cdot 9.81 m/s^2)} \cdot \left(\frac{1}{0.0709^2 m^4} - \frac{1}{0.2827^2 m^4}\right) + 9.81 kN/m^3 \cdot (0 - 4.5) m^2$$

$$P_b = 34.893 kPa$$