Review Notes- Chapter 11

Density $=\rho$ $= m/v$..so $m = \rho v$

For fluids many equations can have m replaced with ρ

Pressure

$P = F/A$ $\quad P_2 = \rho gh + P_1$

- only proportional to height of fluid (not volume or length or area)
- ↑A = ↓F
- gauge < absolute (absolute = gauge + Patm)

Pascal Principle

$F/A = F/A$

- Must be closed system
- Pressure is the SAME throughout system

Archimedes Principle

$F_b = (mg)_\ell = (\rho Vg)_\ell$

IF floats then $mg_o = (\rho Vg)_\ell$

Once submerged...F_b does NOT change since same V displaced

For apparent weight draw FBD

Volume flow rate

$Q = Av$

$Av = Av$ for non-viscous fluids (usually water)

NOTE....this means $v_1/v_2 = r_2^2/r_1^2$

↑A = ↓v

↑A = ↑P

Bernoulli Equation

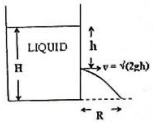
Energy conservation

$P_1 + \rho gh_1 + 1/2\rho v_1^2 = P_2 + \rho gh_2 + 1/2\rho v_2^2$

$P + \rho gh + 1/2\rho v^2 = \text{constant}$

$\Delta P = \Delta \rho gh + \Delta 1/2\rho v^2$

Torecelli's Theorem



Special case of Bernoulli

Must be opened at top

Must have equal pressure at top and bottom

Must be moving close to 0 m/s at top

$\rho gh = 1/2\rho v^2$

****remember h is height of water ABOVE hole***