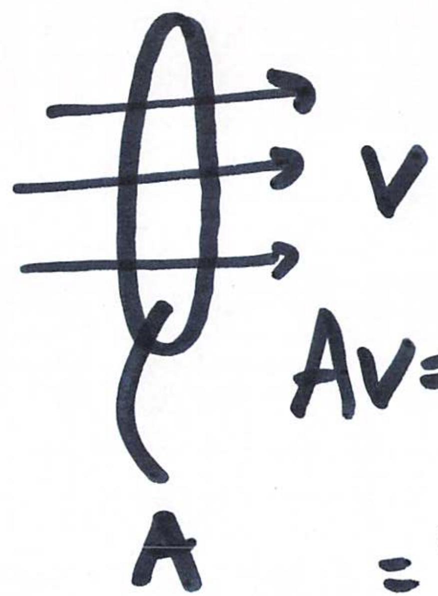
2013-11-26

- fluid flow
  - Bernoulli equation / constant
  - conservative flow. $A_1 v_1 = A_2 v_2$
  - P, ρ, v, g

    $(\Delta P = \rho g h)$



$Av = \frac{\text{volume}}{\text{time}}$

$= \text{volumetric rate}$

pipes — incompressible flow

conservative

constant density.

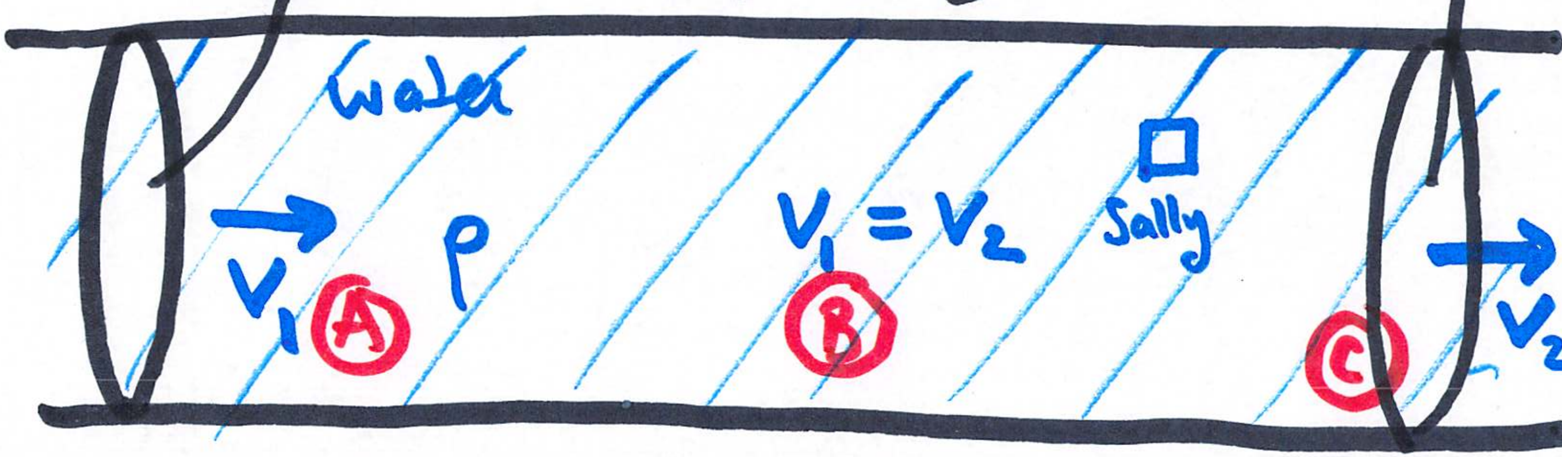
"what goes in, must come out."

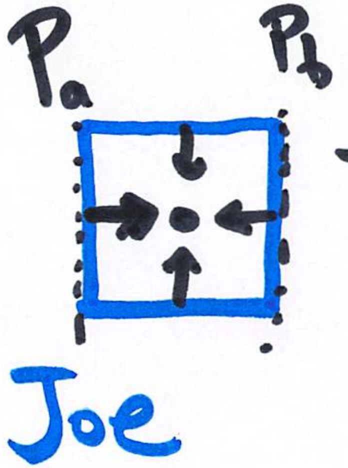
$A_1 V_1 = A_2 V_2$

$A_1 > A_2$

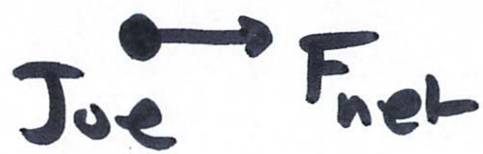
ignore gravity

$A_1 = A_2$



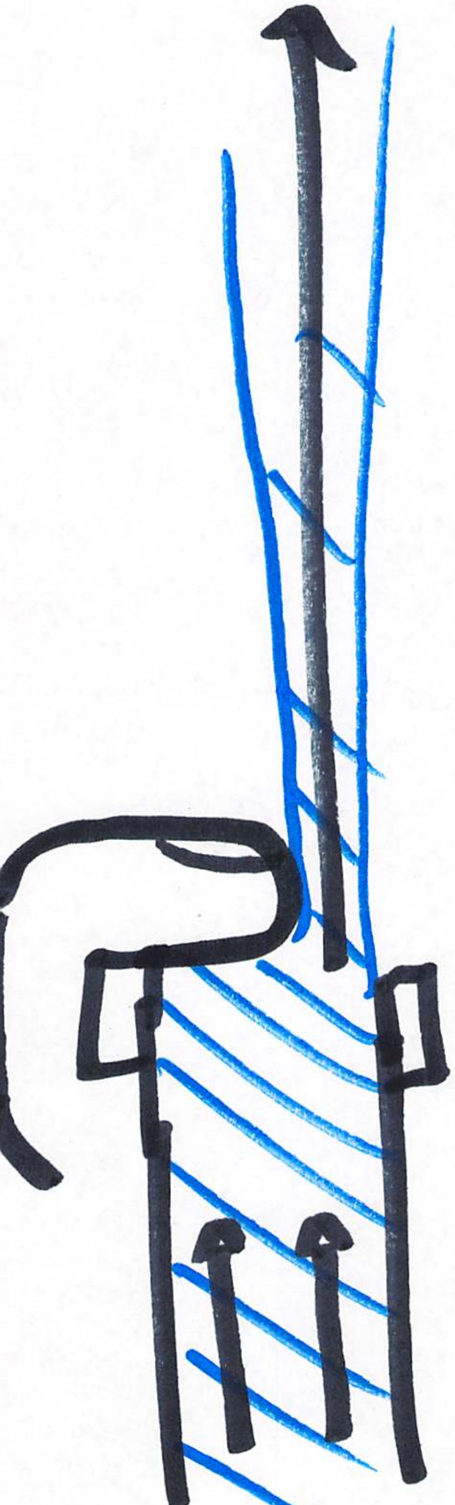


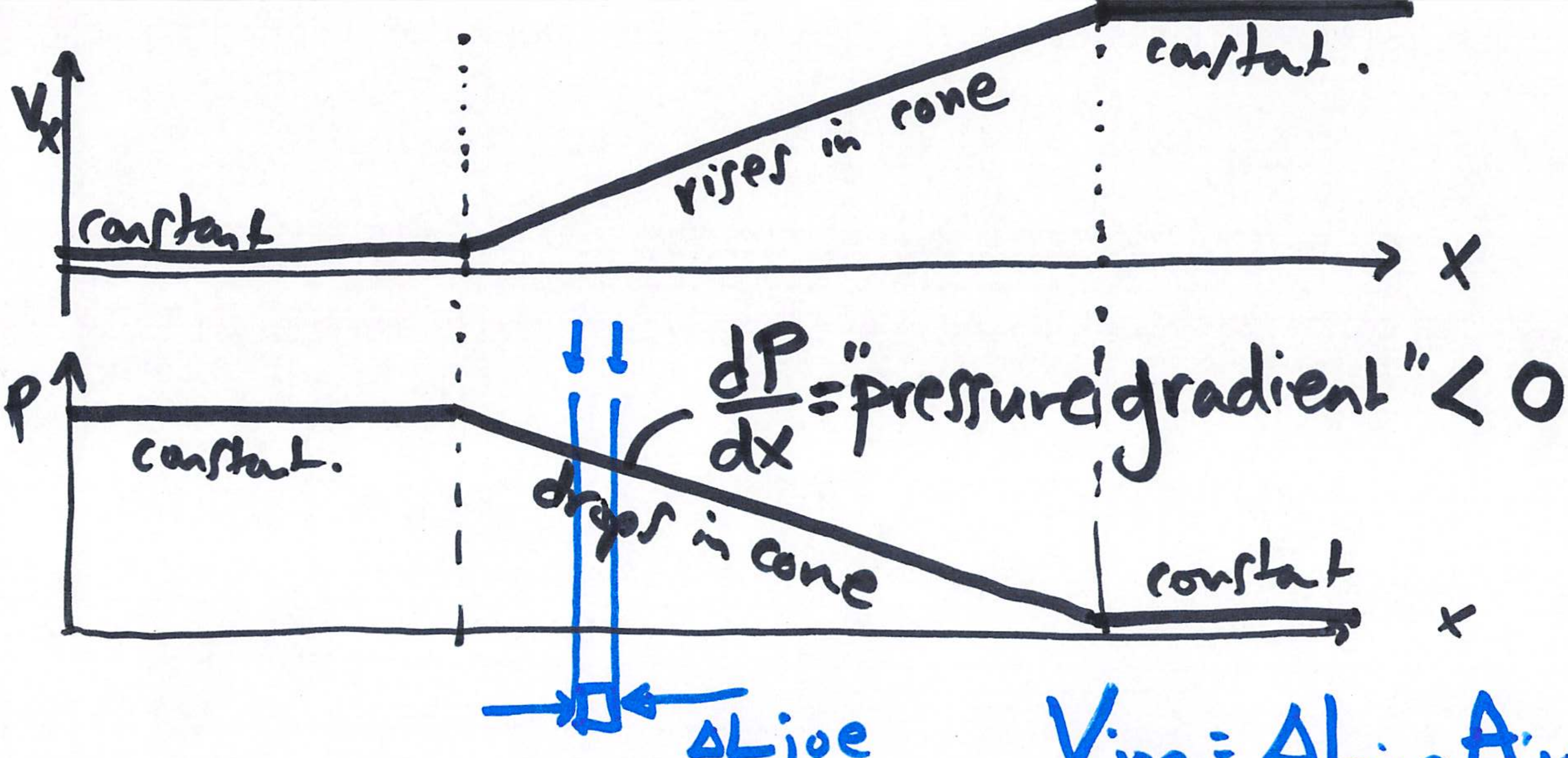
total force on Joe is <u>not</u> zero; it points to the right.



$P_a > P_b$

total force on Sally is <u>zero</u> b/c Sally isn't accelerating.





$$V_{joe} = \Delta L_{joe} A_{joe}$$

$$\Delta P_{Joe} = \frac{dP}{dx} \Delta L_{joe}$$

$$F_{Joe} = \Delta P_{joe} A_{joe}$$

if Joe moves a distance ΔL_{joe}, how much <u>work</u> got done?

$$\Delta W_{Joe} = F_{joe} \cdot \Delta L_{joe}$$

$$\Delta KE_{joe} = \Delta W_{joe} = F_{joe} \cdot \Delta L_{joe}$$

$$= \Delta P_{joe} \cdot A_{joe} \cdot \Delta L_{joe}$$

$$= \frac{dP}{dx} \underbrace{\Delta L_{joe} \cdot A_{joe}} \cdot \Delta L_{joe}$$

$$\underbrace{\Delta KE_{joe}} = \frac{dP}{dx} \cdot V_{joe} \cdot \Delta L$$

change in KE = change in pressure! (times the volume).

Bernoulli equation:

$$\Delta\left(\frac{1}{2}\rho v^2\right) = \Delta P$$

change in pressure

change in kinetic energy per volume