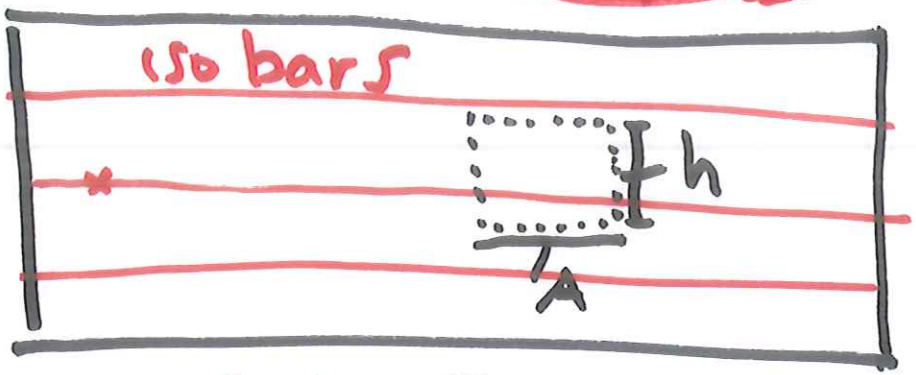
NYU Physics I - 2016-11-03

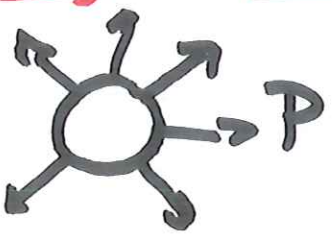
Agenda - reading. - hydrostatics

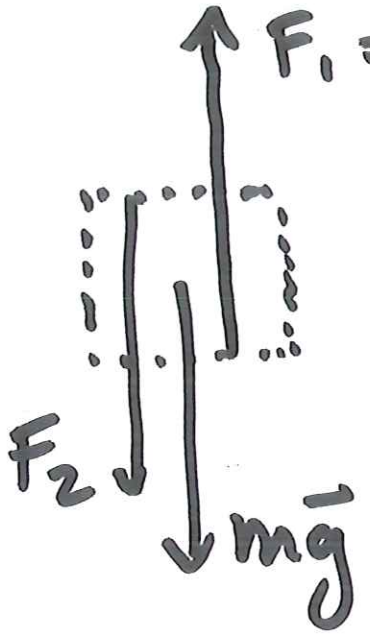
- pressure gradients.
- Exam 4.



subway car @ rest.

pressure is locally isotropic.





generalize

$$\frac{dP}{dh} = \rho g$$

pressure is a scalar

$$m = \rho A h$$

$$0 = P_1 A - P_2 A - \rho A h g$$

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

$$\vec{u} = Q\vec{v}$$

$$\vec{F} = P\vec{A}$$

$$\frac{dP}{dh} = -\rho g$$

$$PV = nRT$$

$$P = \frac{n}{V} RT$$

$$\frac{dP}{dh} = -\frac{m}{RT} g P$$

$$P = \rho \frac{R}{m} T$$

$$P = P_0 e^{-h/\lambda}$$

(if isothermal.)

$$\frac{dP}{dh} = +\rho \vec{g}$$

$$\boxed{\vec{\nabla} \cdot P = \rho \vec{g}}$$

$\lambda \approx 10$ km.

(work it out!)