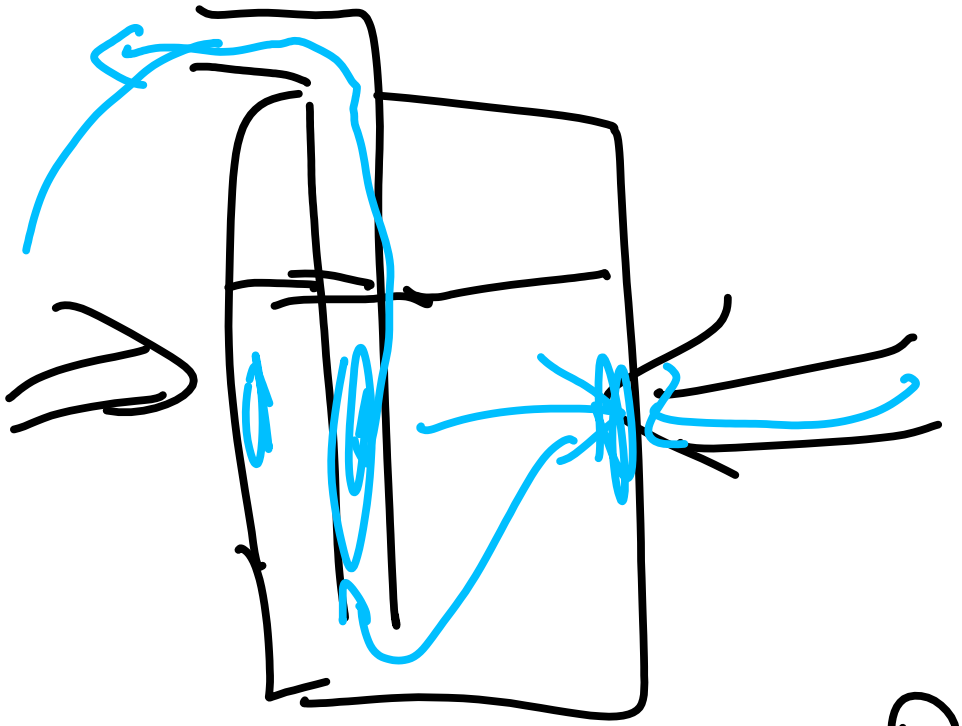
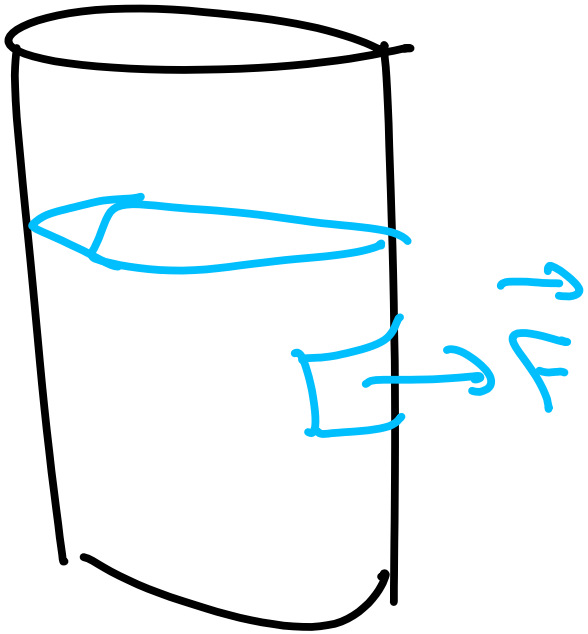


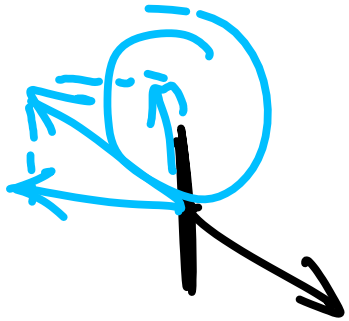
$$\rho = \frac{m}{V}$$

density

$$P = P_0 + mgh$$

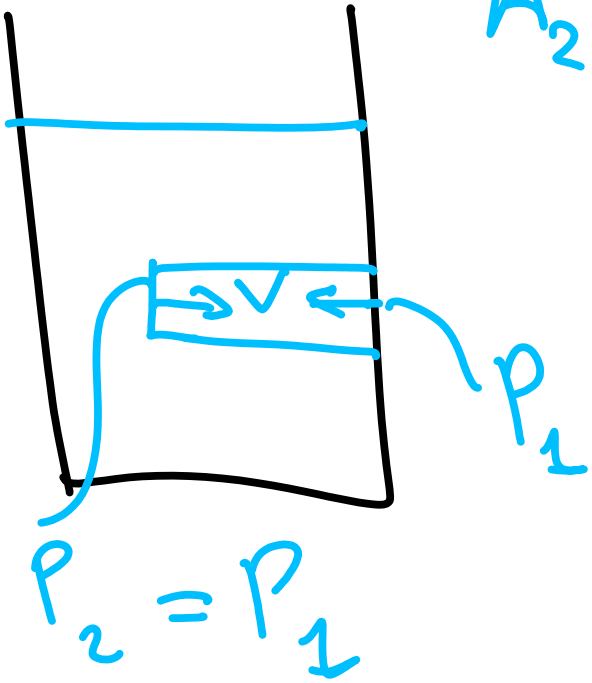
$\vec{v} = 0$

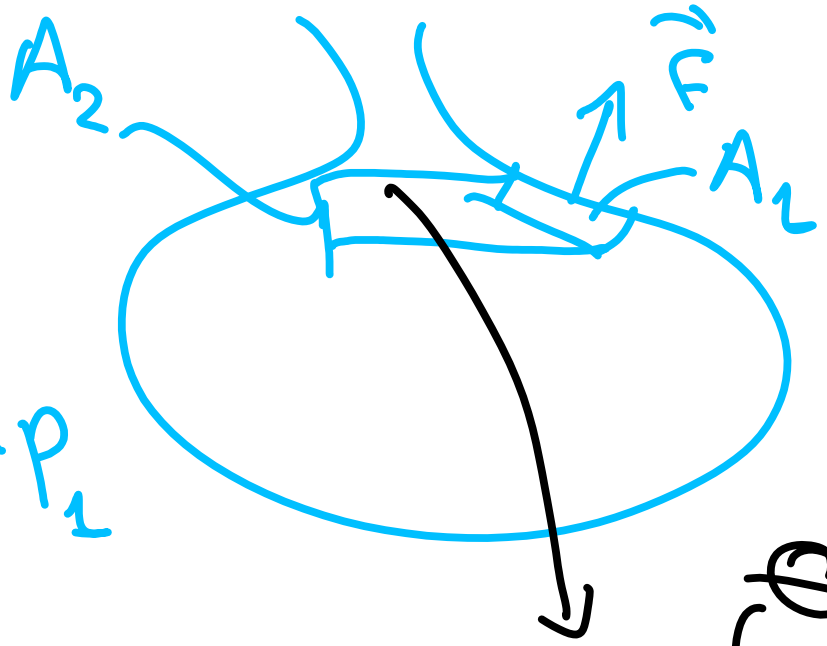




$$P = \frac{|\vec{F}|}{A}$$

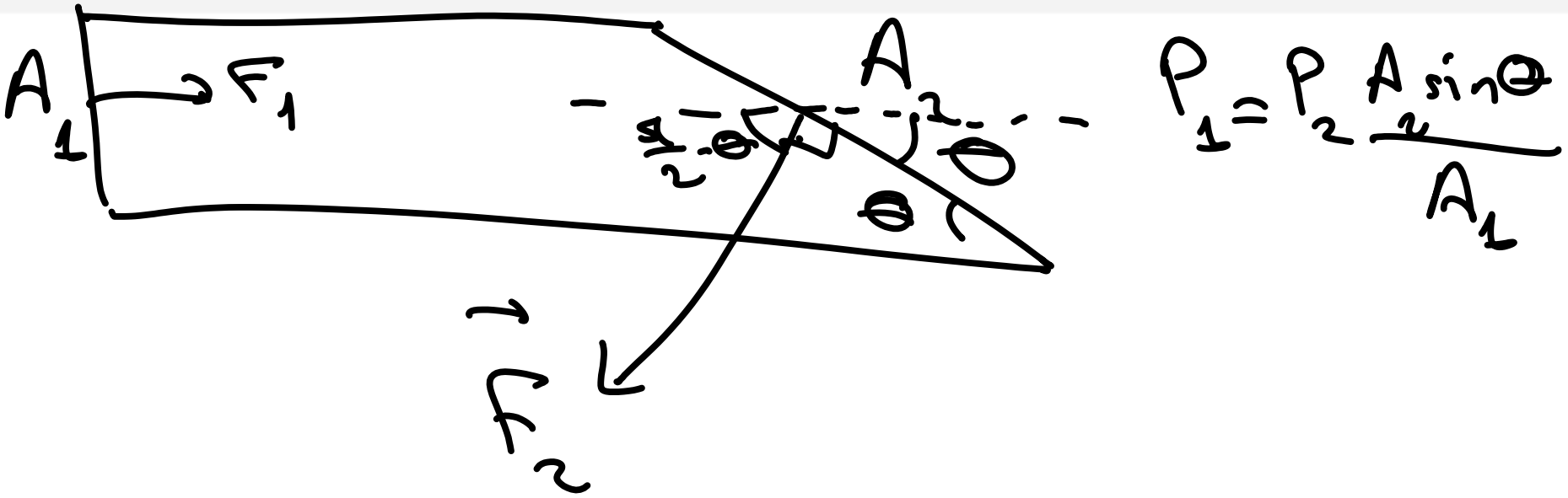
P is a scalar.





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

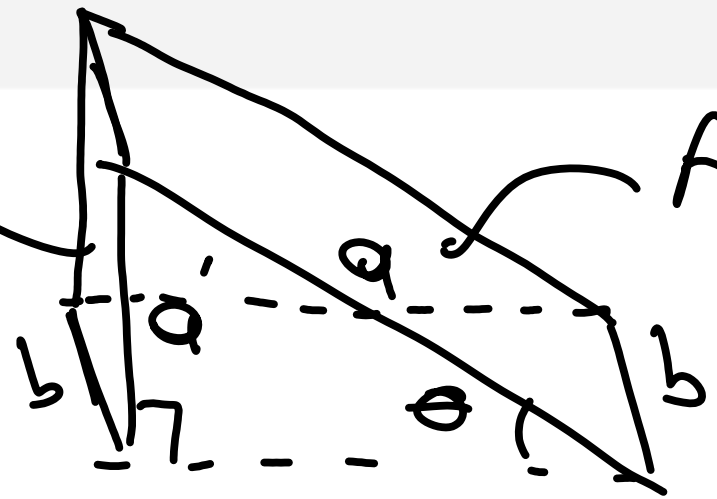
$$F_1 = F_2 \cos\theta$$



$$F_1 = F_2 \cos\left(\frac{\pi}{2}-\theta\right) = F_2 \sin\theta$$

$$P_1 = \frac{F_1}{A_1} = \frac{F_2 \sin\theta}{A_1} = \frac{F_2}{A_2}\,\frac{A_2 \sin\theta}{A_1}$$

$$P_2$$



$$a' = a\sin\theta$$

$$A_1 = a'b = a\sin\theta\, b = A_2\sin\theta$$

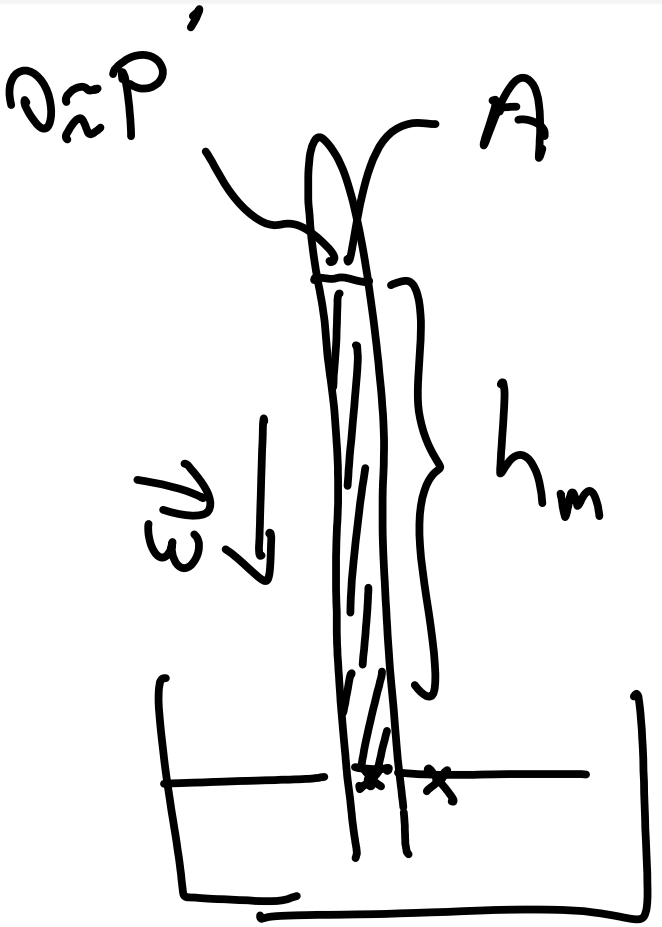
$$\Rightarrow \frac{A_2\sin\theta}{A_1} = 1$$

$$\Rightarrow P_1 = P_2$$

$$P_0 A + \rho V g = P A$$

$$V = Ah$$

$$\boxed{P_0 + \rho g h = P}$$



$$\rho_m A h_m g = P_0 A$$

$$P = P_0 + \rho_m g h = P_0$$

$$\boxed{P_0 = \rho_m g h_m}$$

$$h_m = 764\,mm$$

$$P_0 = \rho_m h_m g$$

$$[P_0] = \frac{[\vec{F}]}{[A]} = N/m^2 \equiv Pa$$

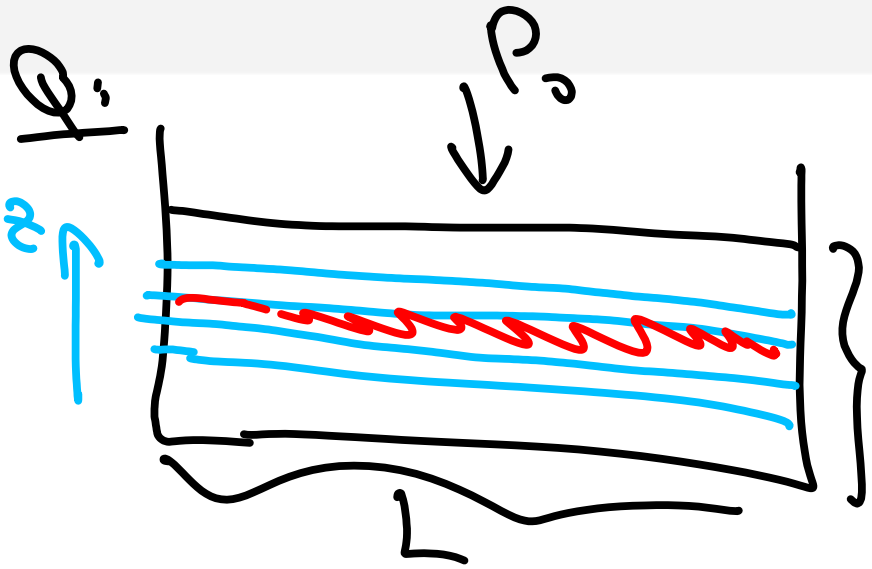
$$[P_0] = mmHg$$

$$1\,atm \equiv 1.013 \times 10^5\ N/m^2 \simeq 760\ mmHg$$

$$1\,bar \equiv 1 \times 10^5\ Pa$$

Department of Physics — Fizik Bölümü — 1960

$$P = P_0 + \underbrace{\rho g h}_{\text{gauge pressure}}$$



$$F_T = ?$$

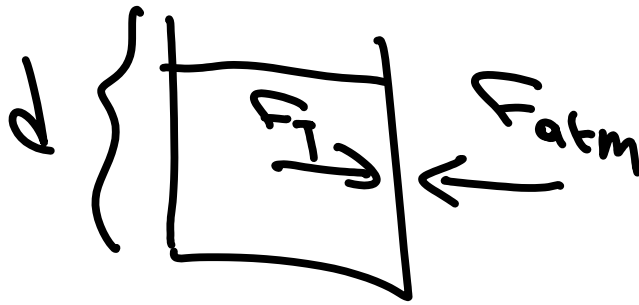
$$P = P_0 + \rho g h$$

$$dA = L\,dz$$

$$dF = (P_0 + \rho g h) L\,dz \quad ; \quad h = d - z$$

$$F_T = \int_0^d (P_0 + \rho g (d - z)) L\,dz$$

$$F_T = \int_0^d (P_0 + \rho g (d - z)) L \, dz$$



$$F_{atm} = P_0 L d$$

$$F_T - F_{atm} = \int_0^d \rho g (d - z) L \, dz$$

$$= \rho g \frac{d^2 L}{2} = 10^3 \frac{kg}{m^3} \, 10 \, m/s^2 \, \frac{100 m^3}{2}$$

panora aquarium $= 5 \times 10^5 N$

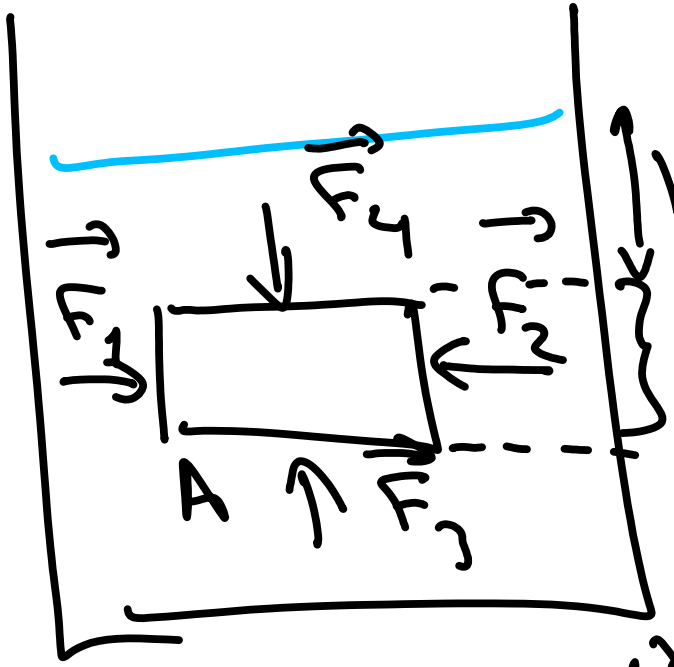
Department of Physics — Fizik Bölümü — 1960

$$F_{\text{on a}\atop\text{aquarium}} = \rho g \frac{d^2 L}{2} = 10^3 \frac{kg}{m^3} 10 \frac{m}{s^2} \frac{1}{10} m^2 m$$

$$\simeq 10^3 \, N$$

Buoyancy

$$F_1 = F_2$$



$F_3 > F_4$

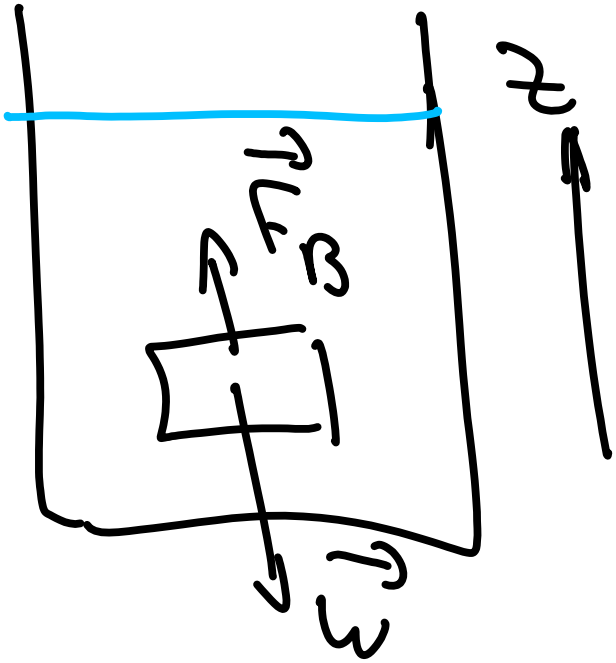
$$F_3 = (P_0 + \rho g h_2) A$$

$$F_4 = (P_0 + \rho g h_1) A$$

$$F_3 - F_4 = (P_0 + \rho g h_2) A - (P_0 + \rho g h_1) A$$

$$= \rho g (h_2 - h_1) A = \boxed{\rho V g}$$

F_B: weight of the liquid that the object replaces

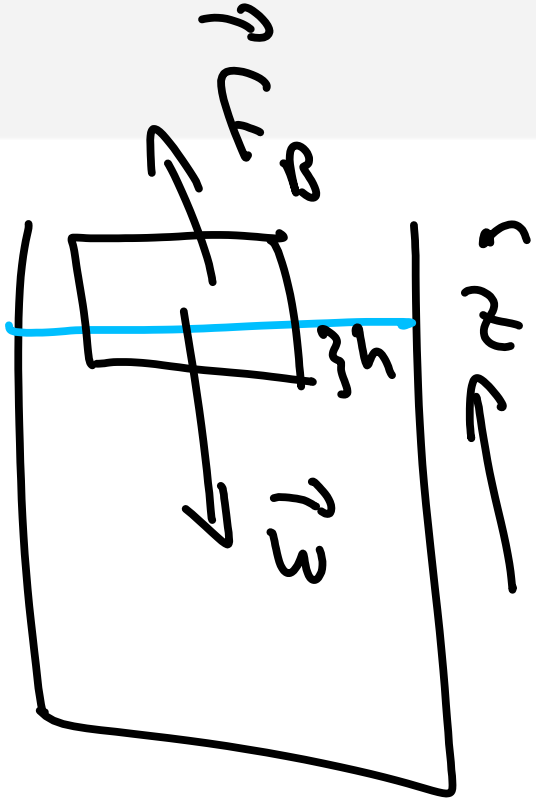


$$\vec{F}_B = +\rho_l V g \hat{z}$$

$$\vec{w} = -\rho_o V g \hat{z}$$

$$\boxed{\vec{F}_T = (\rho_l - \rho_o) V g \hat{z}}$$

$$m_o = \rho_o V$$



$$\vec{F}_T = 0$$

$$\vec{F}_B = +\rho_l V_{in} g \hat{z}$$

$$\vec{w} = -\rho_0 V_0 g \hat{z}$$

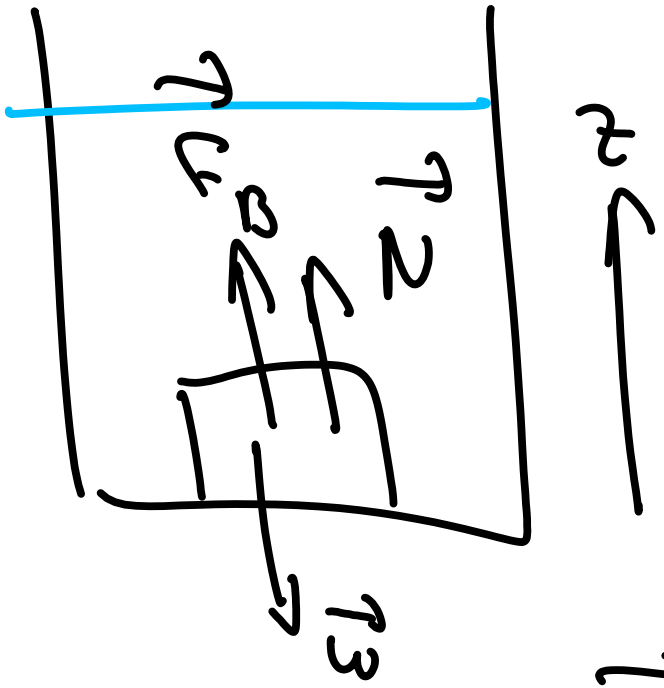
$$F_B = PA$$

$$= \rho_l g (hA) V_{in}$$

$$\Rightarrow \rho_l V_{in} g = \rho_0 V_0 g$$

$$\frac{V_{in}}{V_0} = \frac{\rho_0}{\rho_l}$$

Sinking



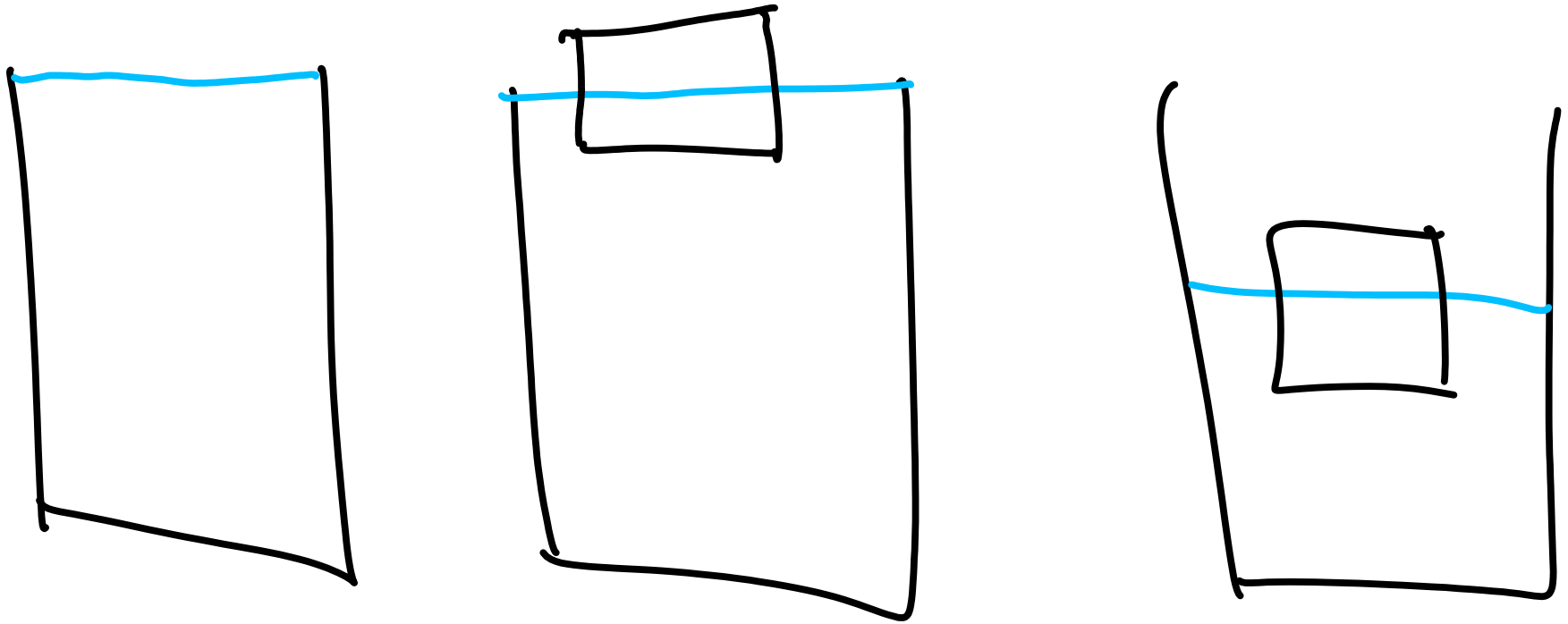
$$\vec{F}_b = +\rho_l V g \hat{z}$$

$$\vec{w} = -\rho_o V g \hat{z}$$

$$\vec{N} = N \hat{z}$$

$$\vec{F}_r = 0$$

$$\Rightarrow \boxed{N - \rho_o V g + \rho_l V g = 0}$$



$$F_B = \rho V_{in} g = w$$

$$\Delta w_g = w - \rho V_{in} g = 0$$

QUIZ-9

Happy New Year!

What is the date tomorrow?