Oppg 1) $T(z) = T_0 - \alpha z$ Vegard G. Jervell

$$pV = nRT$$

$$\rho = \frac{P}{RT}$$

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

$$\frac{\partial P}{\partial z} = \rho g$$

$$\int_0^z \frac{dp}{P} = \int_0^z \frac{g\,dz}{RT(z)}$$

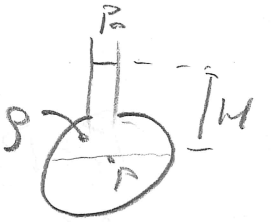
$$\ln\left(\frac{P}{P_0}\right) = \frac{g}{R} \int_0^z \frac{dz}{T_0 - \alpha z}$$

$$\ln\left(\frac{P}{P_0}\right) = \frac{g}{R}\left(\frac{-1}{\alpha} \ln\left(\frac{T_0 - \alpha z}{T_0}\right)\right)$$

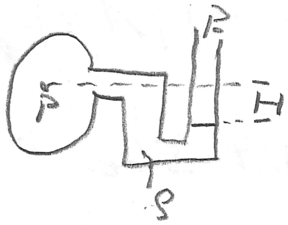
$$\frac{P}{P_0} = \left(\frac{T_0}{T_0 - \alpha z}\right)^{\frac{g}{\alpha R}}$$

$$P = P_0 \left(\frac{T_0}{T_0 - \alpha z}\right)^{\frac{g}{\alpha R}}$$

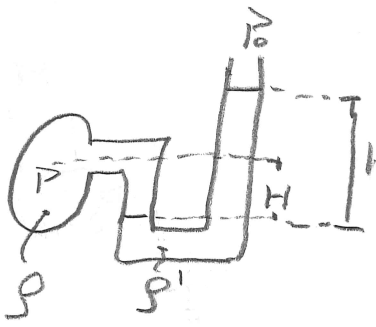
Oppg. 2)



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



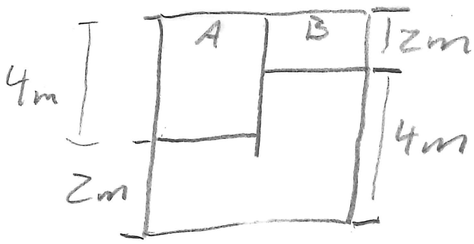
$$P = P_0 - \rho g H$$



$$P + \rho g H = P_0 + \rho' g H'$$

$$P = P_0 + g(\rho' H' - \rho H)$$

Oppg 3)



$$P_B + g\int_0^2 \rho_L(h)\,dh + g\int_0^4 \rho_v\,dh = P_A + g\int_0^4 \rho_L\,dh + g\int_0^2 \rho_v\,dh$$

$\rho_v = 997\,\frac{kg}{m^3}$

$\rho_L = 1{,}2\,\frac{kg}{m^3}$

$$P_B = P_A + g\int_2^4 \rho_L\,dh - g\int_2^4 \rho_v\,dh$$

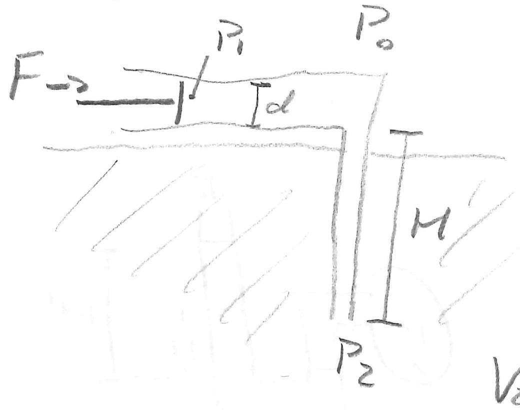
$$P_B = P_A + 2g(\rho_L - \rho_v)$$

$$\underline{P_B = 75462\,Pa}$$

3b) dersom det antas at $\rho_L = 0$

$$\underline{P_B = 75438\,Pa}$$

Oppg. 4a)



$$P_2 = P_0 + \rho g H$$

$$F = P_1 A = P_1\,\pi\left(\frac{d}{2}\right)^2$$

Ved statiske forhold er $P_1 = P_2$

$$F = (P_0 + \rho g H)\,\pi\left(\frac{d}{2}\right)^2 = 200\,N$$

4b)