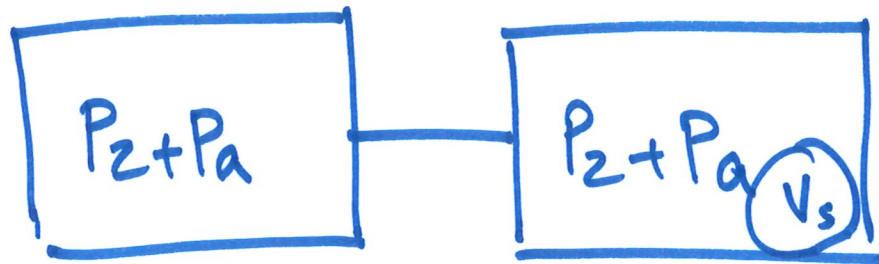
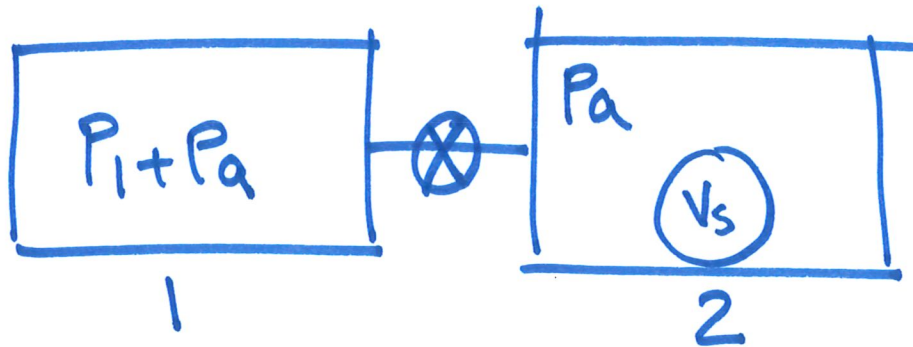


Example:

9/7/23

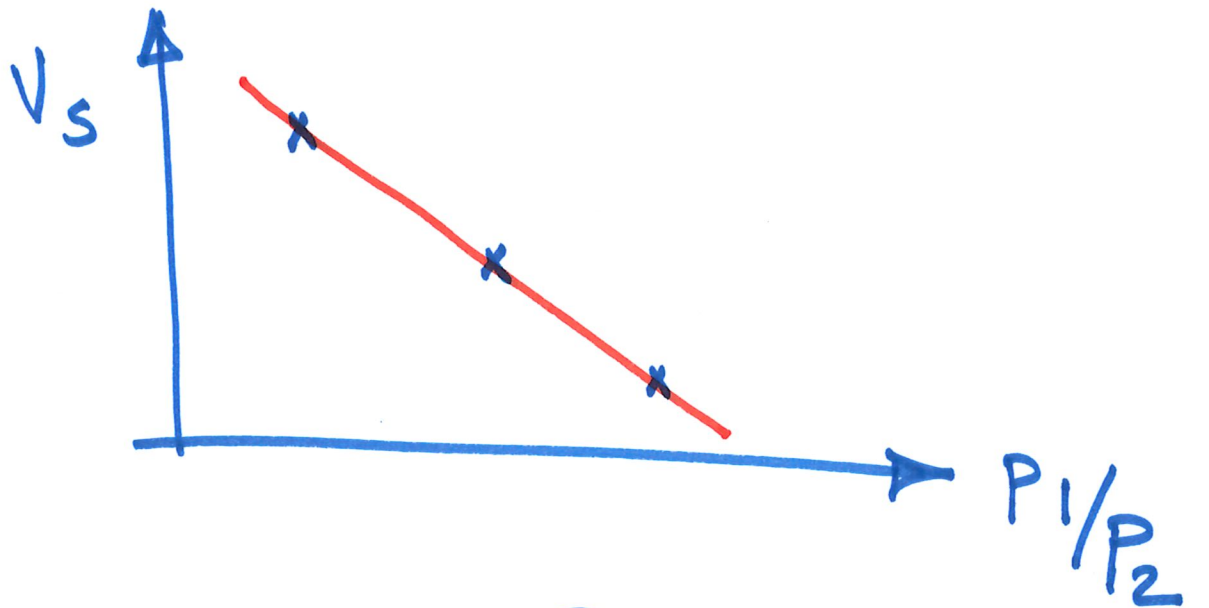


$$(P_1 + P_a)V_1 + P_a(V_2 - V_s)$$

$$= (P_2 + P_a)(V_1 + V_2 - V_s)$$

$$\Rightarrow V_s = (V_1 + V_2) - \frac{P_1}{P_2} V_1$$

Red arrows point down from  $V_s$  to  $Y$  and from  $\frac{P_1}{P_2} V_1$  to  $X$ .



$$V_s = -25.3 \frac{P_1}{P_2} + 75.5 \quad \leftarrow$$

$$\begin{aligned} V_1 &= 25.3 \text{ cm}^3 \\ V_2 &= 50.2 \text{ cm}^3 \end{aligned}$$

~~$V_b = 32$~~

③  $\phi = ?$

$$V_b = 32 \text{ cm}^3$$

$$P_2 = 50.4 \text{ psig}$$

$$P_1 = 100 \text{ psig}$$

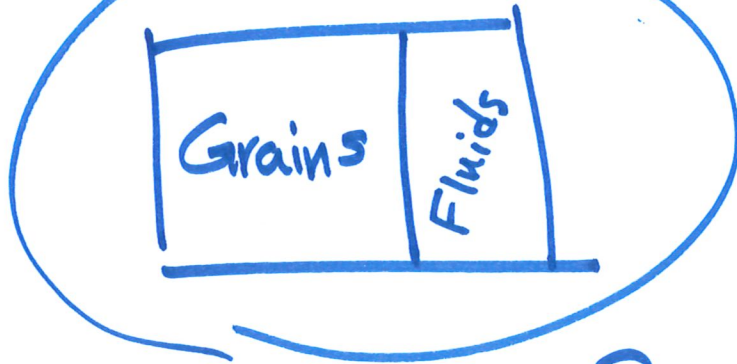
②

$$V_s = -25.3 \frac{100}{50.4} + 75.5$$

$$\rightarrow V_s = 25 \text{ cm}^3$$

$$\phi = \frac{V_b - V_s}{V_b} = \underline{21\%}$$

# Density



$$\underline{\underline{\rho_b}} \xrightarrow{?} \phi$$

$$\rho_b = \phi (\rho_f) + (1 - \phi) \rho_m$$

$$\rightarrow \boxed{\phi = \frac{\rho_b - \rho_m}{\rho_f - \rho_m}}$$

Arrows point from the labels  $\rho_b$ ,  $\rho_m$ ,  $\rho_f$ , and  $\rho_m$  in the equation to their respective positions in the boxed formula.

$$\rho_m = \sum C_i \rho_i$$

An arrow points to the  $C_i$  term in the equation.

$$\rho_f = S_w \rho_w + (1 - S_w) \rho_{HC}$$