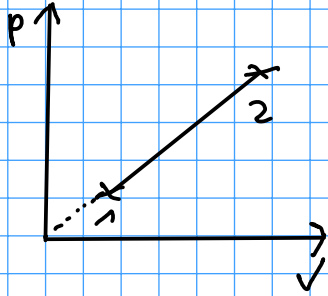


Aufgabe 16



$$pV^{-1} = \text{const}$$

$$\Rightarrow p = \text{const} \cdot V$$

$$n = -1$$

$$m = 10^{-3} \text{ kg}$$

$$p_1 = 29.5 \text{ bar} \quad p_2 = 38.2 \text{ bar}$$

$$T_1 = 945^\circ \text{C} = \dots \text{ K} \quad T_2 = \dots$$

$$V_1 = \dots \quad V_2 = \dots$$

$$W_{V12} = \dots$$

$$Q_{12} = W_{V12} \frac{n-\alpha}{\alpha-1} = \dots$$

$$H_2 - H_1 = m \overline{c_p} (T_2 - T_1) = \dots$$

$$U_2 - U_1 = m \overline{c_v} (T_2 - T_1) = \dots$$

$$\overline{c_v} = \overline{c_p} - R_i = \dots$$

$$p \cdot V = n R_i T$$

$$\frac{V_1}{V_2} = \frac{n R_i T_1}{p_1} = \dots$$

$$\frac{p_1^{1-n}}{T_1^n} = \frac{p_2^{1-n}}{T_2^n}$$

$$T_2 = \left(\frac{p_2}{p_1} \right)^{\frac{n-1}{n}} T_1$$

$$p_1 V_1^n = p_2 V_2^n$$

$$V_2 = \left(\frac{p_1}{p_2} \right)^{\frac{1}{n}} V_1 = \dots$$

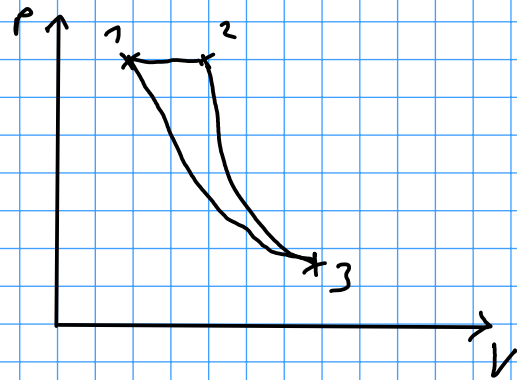
$$\alpha = \frac{1.0113}{0.113} = \frac{1.0113}{0.113} = \dots$$

Aufgabe 17

sys: m, p_1, T_1 (in K!)

$$\textcircled{1} \quad V_1 = \frac{m R_1 T_1}{p_1} = \dots$$

$$u_2 = 0 \quad H_1 = u_1 + p_1 V_1 = v$$



$$\textcircled{2} \quad p_2 = p_1 = \dots v$$

$$Q_{12} = m \bar{c}_p (T_2 - T_1)$$

$$T_2 = T_1 + \frac{Q_{12}}{m \bar{c}_p} = \dots v$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$c_p - c_v = R_1$$

$$c_v = c_p - R_1 = \dots$$

$$V_2 = \left(\frac{T_2}{T_1}\right) V_1 = v$$

$$u_2 - u_1 = m \bar{c}_v (T_2 - T_1) = \dots v \rightarrow u_2 =$$

$$p_2 V_2^{\kappa} = p_3 V_3^{\kappa}$$

$$H_2 = H_1 + m \bar{c}_p (T_2 - T_1) = v$$

$\textcircled{3} \quad n = 1.2$ **lekt. Reakt!**

$$p_3 = \left(\frac{T_3}{T_2}\right)^{\frac{\kappa}{\kappa-1}} p_2 = \dots$$

$$u_3 = u_2 + m \bar{c}_v (T_3 - T_2) = \dots$$

\rightarrow 1 isotherm $\rightarrow T_3 = T_1 = \dots$

$$V_3 = \left(\frac{p_2}{p_3}\right)^{\frac{1}{\kappa-1}} V_2 = \dots$$

$$H_3 = H_2 + m \bar{c}_p (T_3 - T_2) = \dots$$

$$W_k = ?$$

$$W_k = \sum W_{V_i} = W_{V_{12}} + W_{V_{23}} + W_{V_{31}} = \dots$$

$$W_k = -\sum Q_i = -(Q_{12} + Q_{23} + Q_{31})$$

$$\eta = \frac{-W_k}{Q_{21}}$$

$$\alpha = \frac{Q_{21}}{Q_{12}} = \dots$$

$$Q_{12} = m \overline{c_p} (T_2 - T_1) = \checkmark \quad (> 0)$$

$$Q_{23} = m \overline{c_v} (T_3 - T_2) \cdot \frac{n-2}{n-1} = \checkmark \quad (> 0)$$

$$Q_{31} = -m R_c \cdot T_1 \ln \frac{V_3}{V_1} = \dots \quad \checkmark \quad | < 0$$

$$W_k = \sum Q_i = \dots$$

$$Q_{21} = Q_{12} + Q_{23} = \dots$$

$$\eta = \frac{-W_k}{Q_{21}} = \dots 40,15\%$$