N 2.31

~~$T_1 T_2$~~

T_1

T_2

$p_1 = p_2$

$i = 3$

$C_V = \frac{3}{2} R$

I) Найдём конечную T смеси.

Так как система изолирована $|\Delta U_1| = |\Delta U_2|$

$$\cancel{\frac{i}{2}} \cancel{R} (T - T_1) = \cancel{\frac{i}{2}} \cancel{R} (T - T_2)$$

$$T = \frac{|T_1 - T_2|}{2}$$

II) ~~$\Delta S = \Delta S_1$~~

$$p_1 V_1 = R T_1 \Rightarrow \frac{V_1}{V_2} = \frac{T_1}{T_2}$$

$$p_2 V_2 = R T_2$$

$$V = V_1 + V_2 \nearrow V = V_2 + V_2 \cdot \frac{T_1}{T_2}$$

$$\searrow V = V_1 + V_1 \cdot \frac{T_2}{T_1}$$

III) $\Delta S = \Delta S_1 + \Delta S_2$

$$\Delta S_1 = R \ln\left(\frac{V}{V_1}\right) + C_V \ln\left(\frac{T}{T_1}\right)$$

$$\Delta S_2 = R \ln\left(\frac{V}{V_2}\right) + C_V \ln\left(\frac{T}{T_2}\right)$$

~~$\Delta S = R \cancel{\ln}$~~ $\Delta S = R \left(\ln\left(1 + \frac{T_2}{T_1}\right) + \ln\left(1 + \frac{T_1}{T_2}\right) + \frac{3}{2}\left(\ln\left(\frac{|T_1 - T_2|}{2T_1}\right) + \ln\left(\frac{|T_1 - T_2|}{2T_2}\right)\right)\right)$

$$\Delta S = R \left(\ln 2 + \frac{T_1}{T_2} + \frac{T_2}{T_1} + \frac{3}{2} \ln\left(\frac{(T_1 - T_2)^2}{4 T_1 T_2}\right)\right)$$