

# Clase 24 20 octubre 2020

Título de la nota

20/10/2020

Proceso Isocórico  $V = \text{cte}$

$n_1 \rightarrow n_2 = \text{cte}$  cerrado

$V_1 \rightarrow V_2 = \text{cte}$

$p_1 \rightarrow p_2$  }  $p_2 > p_1$   $T_2 > T_1$  calent.

$T_1 \rightarrow T_2$  }  $p_1 > p_2$   $T_1 > T_2$  enfriam.

$$W = 0 \quad \Delta U = q - \cancel{w}^0$$

Sistema rígido

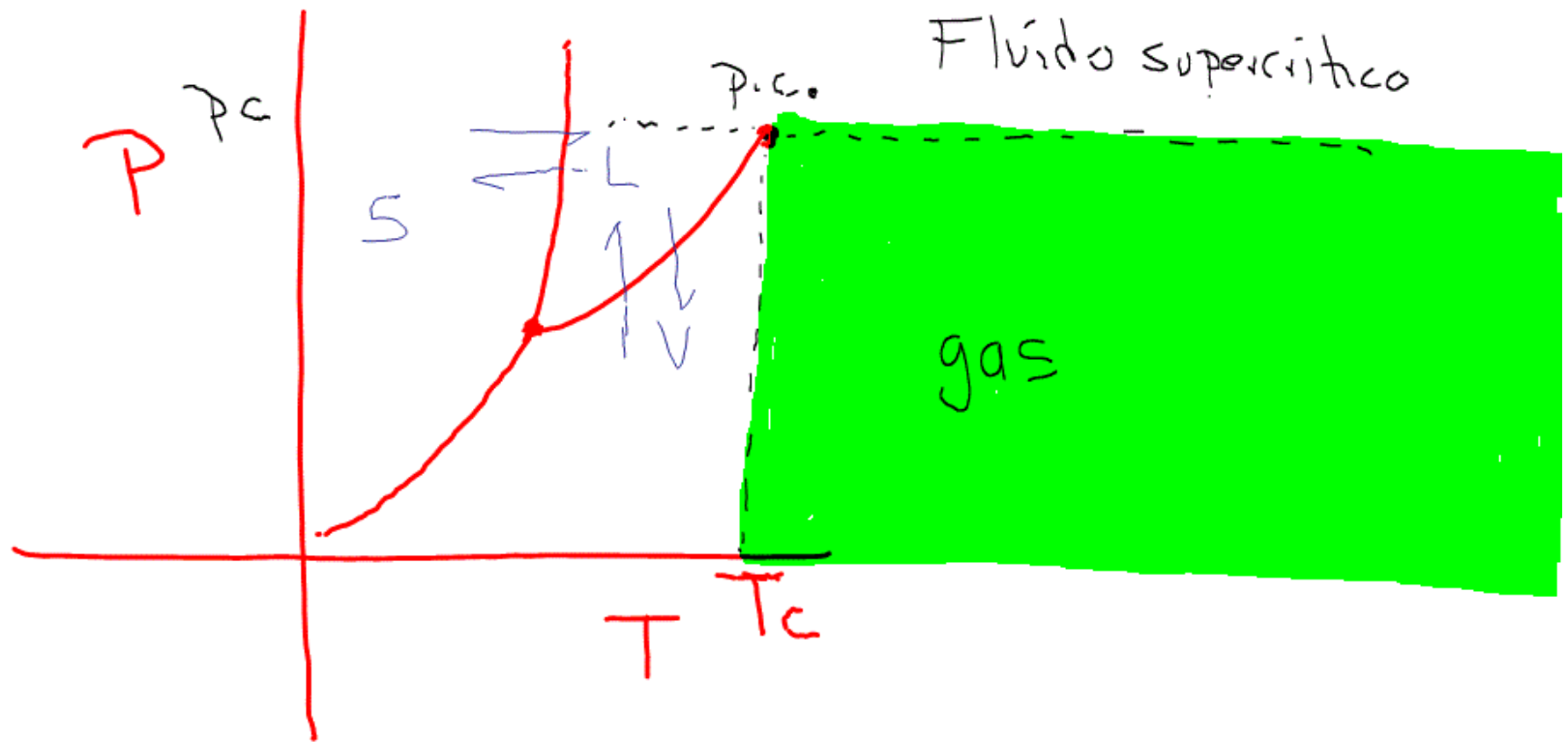
propiedades críticas ( $T_c, V_c, p_c$ )

gas

$$\left\{ \begin{array}{l} T > T_c \\ P < P_c \end{array} \right.$$

vapor

$$\left\{ \begin{array}{l} T < T_c \\ P < P_c \end{array} \right.$$



$$V_1 = \frac{n_1 R T_1}{P_1} \quad V_2 = \frac{n_2 R T_2}{P_2}$$

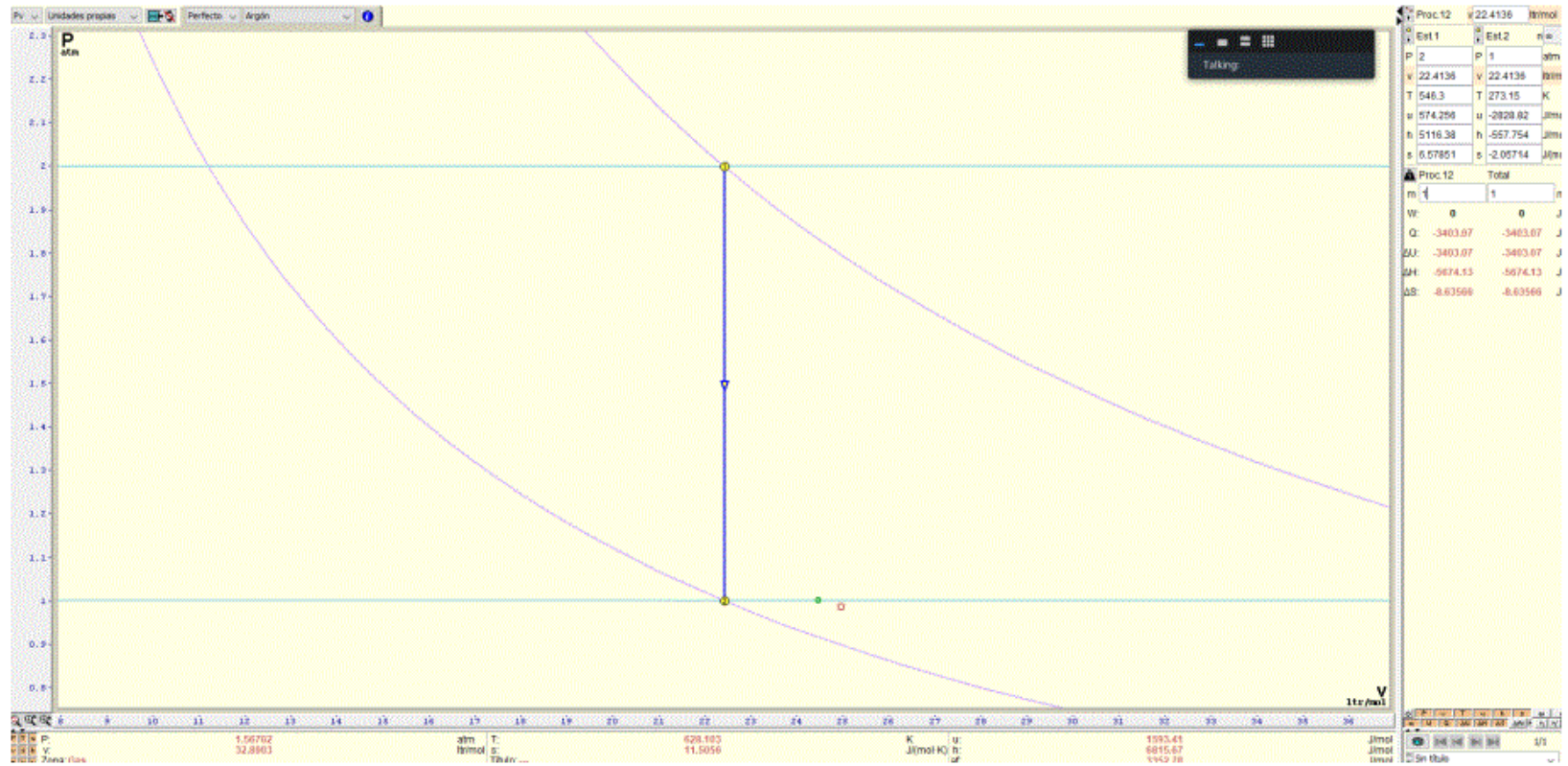
$$V_1 = V_2$$

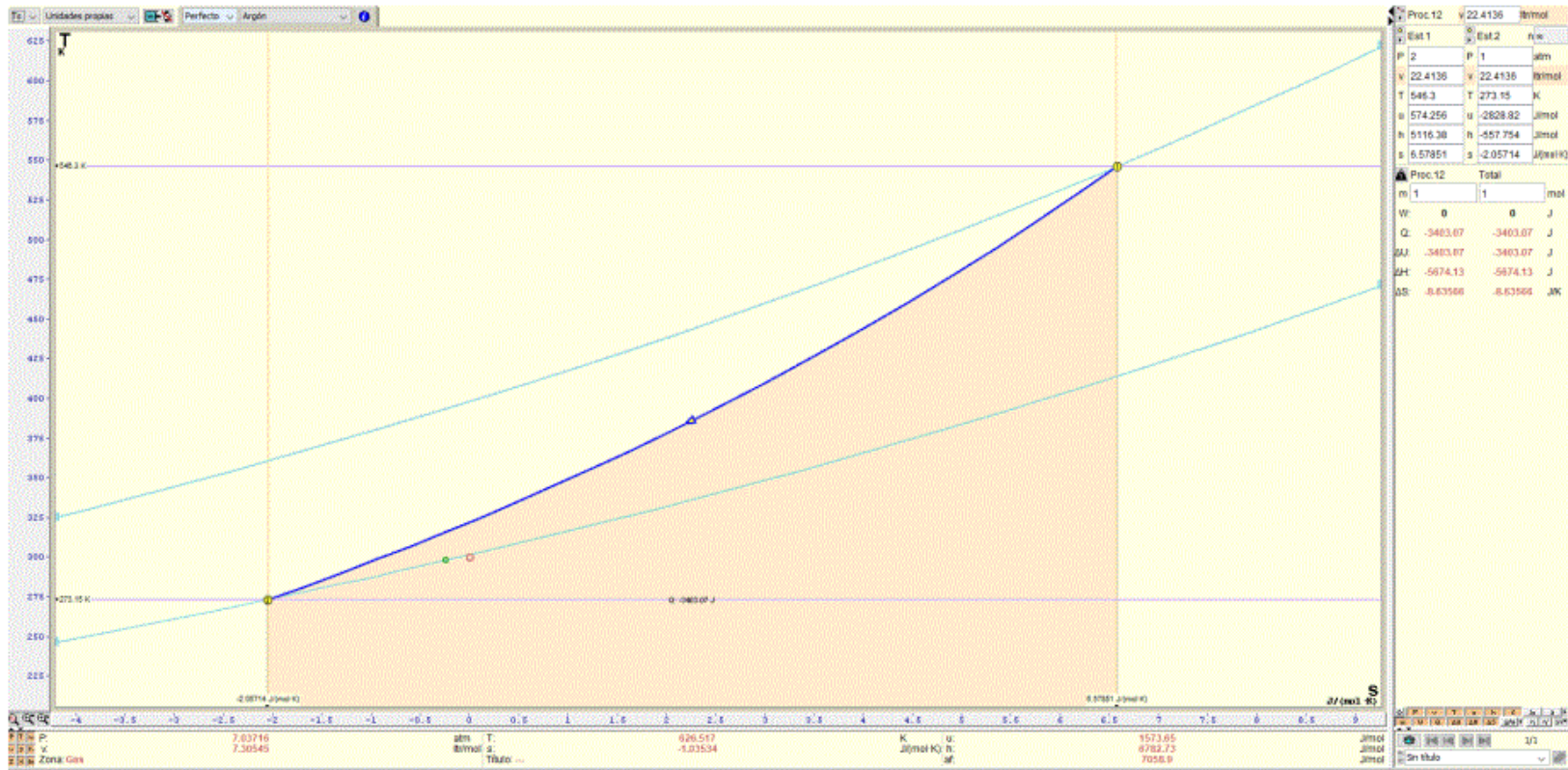
$$\frac{\cancel{n_1} R T_1}{P_1} = \frac{\cancel{n_2} R T_2}{P_2}$$

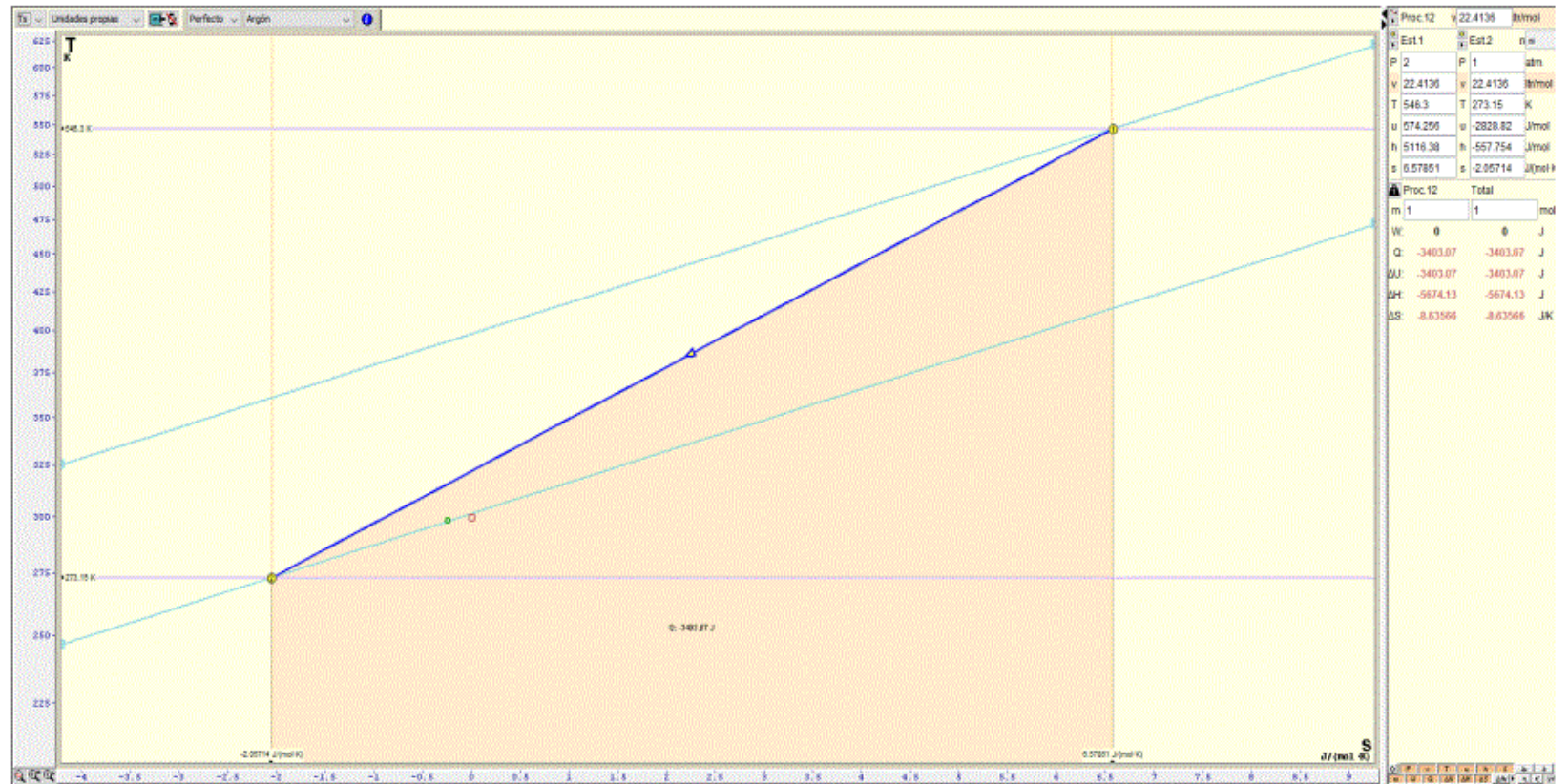
$$\frac{T_1}{P_1} = \frac{T_2}{P_2}$$

$$T_2 = \frac{T_1 P_2}{P_1}$$

$$P_2 = \frac{T_2 P_1}{T_1}$$







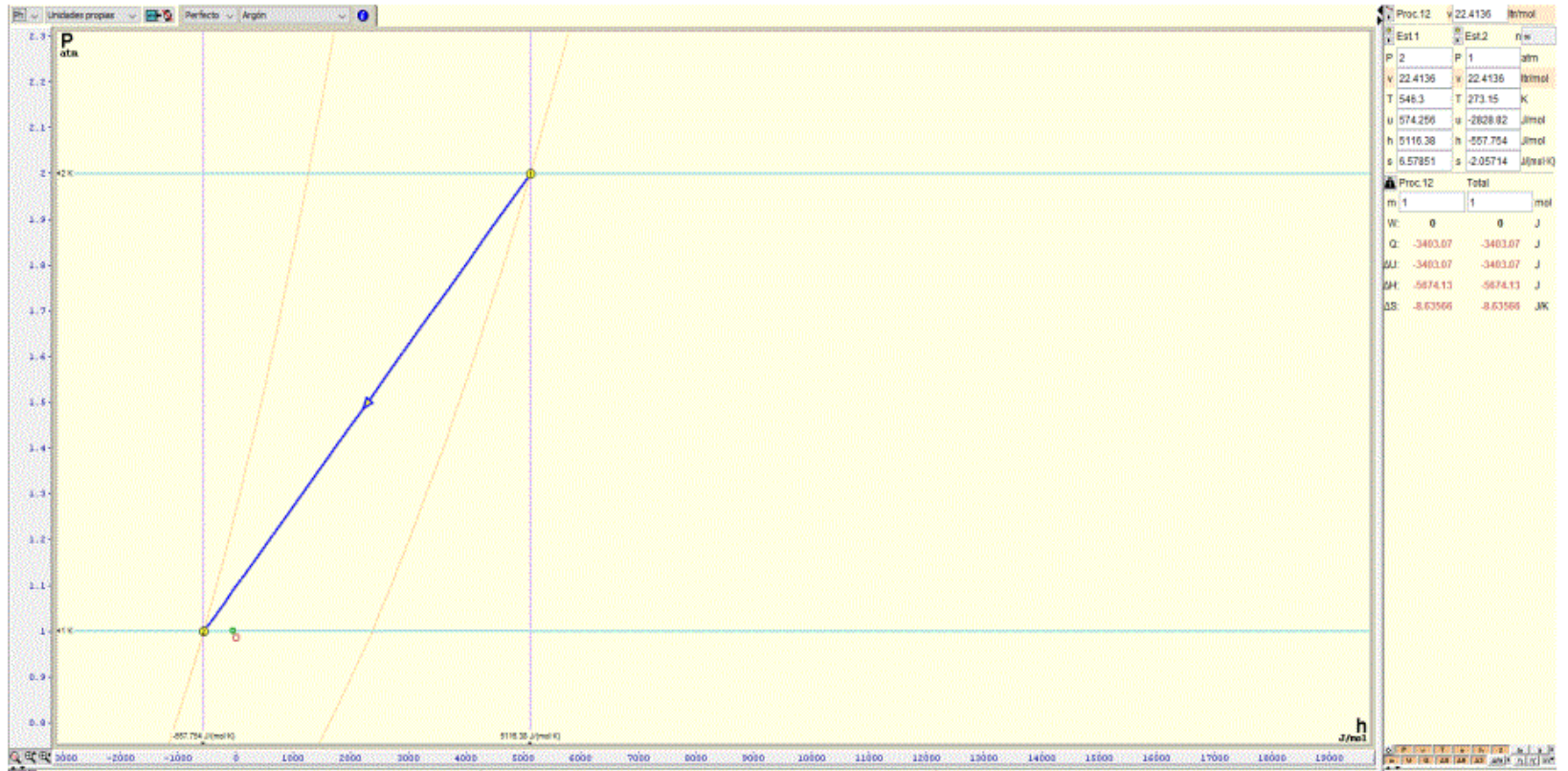
$$ds = \frac{\dot{d}q}{T}$$

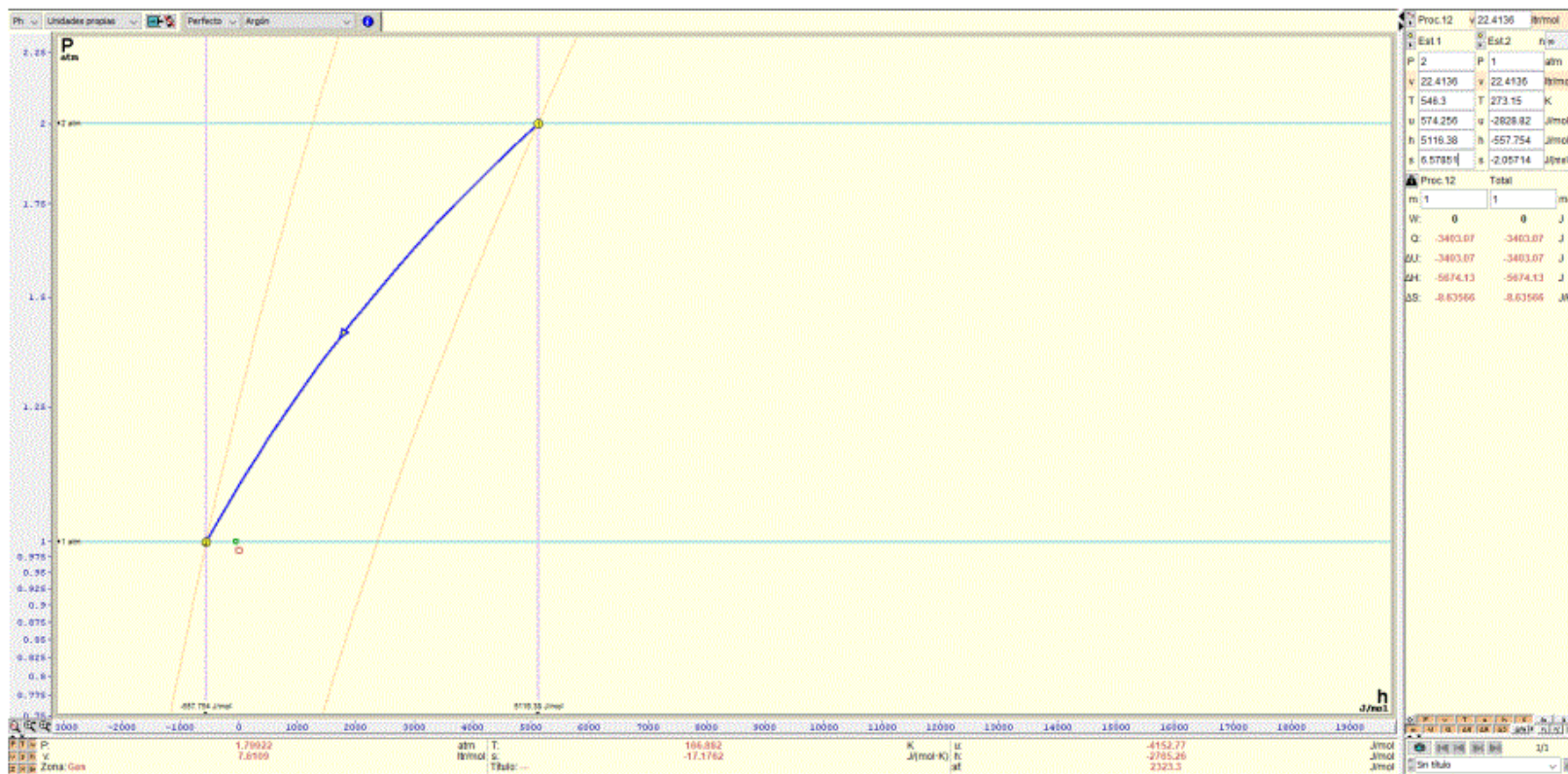
$$\int_1^2 ds = \int_{T_1}^{T_2} \frac{n \bar{C}_v dT}{T} \quad \text{perfecto}$$

$$\Delta S = n \int_{T_1}^{T_2} \frac{C_v dT}{T} = n \bar{C}_v \int_{T_1}^{T_2} \frac{dT}{T}$$

$$\Delta S = n \bar{C}_v \ln \frac{T_2}{T_1}$$







$$\Delta H = n \bar{c}_p (T_2 - T_1)$$

$$\Delta H = 1 \text{ mol} \left[ \frac{5}{2} \left( \frac{8.314 \text{ J}}{\text{mol K}} \right) (546.3 - 273.15) \text{ K} \right]$$

$$= 5677.42 \text{ J}$$

$$\Delta U = n \bar{c}_v (T_2 - T_1)$$

$$= n \left[ \left( \frac{3}{2} R \right) (T_2 - T_1) \right]$$

$$\Delta U = 1 \text{ mol} \left[ \frac{3}{2} \left( \frac{8.314 \text{ J}}{\text{mol K}} \right) (546.3 - 273.15) \text{ K} \right]$$

calentamiento

|              |         |         |     |
|--------------|---------|---------|-----|
| W:           | 0       | 0       | J   |
| Q:           | 3403.07 | 3403.07 | J   |
| $\Delta U$ : | 3403.07 | 3403.07 | J   |
| $\Delta H$ : | 5674.13 | 5674.13 | J   |
| $\Delta S$ : | 8.63566 | 8.63566 | J/K |

$$= 3406.45 \text{ J} = 9$$

|     |          |          |     |
|-----|----------|----------|-----|
| W:  | 0        | 0        | J   |
| Q:  | -3403.07 | -3403.07 | J   |
| ΔU: | -3403.07 | -3403.07 | J   |
| ΔH: | -5674.13 | -5674.13 | J   |
| ΔS: | -8.63566 | -8.63566 | J/K |

enfriamiento

$$\begin{aligned}
 \Delta S &= n \bar{C}_v \ln \frac{T_2}{T_1} \\
 &= 1 \cancel{\text{mol}} \left[ \frac{3}{2} \left( \frac{8.314 \text{ J}}{\cancel{\text{mol K}}} \right) \right] \left( \ln \frac{273.15 \cancel{\text{K}}}{346.3 \cancel{\text{K}}} \right) \\
 &= -8.644 \frac{\text{J}}{\text{K}}
 \end{aligned}$$

