$$\frac{S}{Nm} = \frac{k}{m}\left(\frac{3}{2}\ln T + \ln\frac{V}{Nm} + c\right) = cte \Rightarrow \frac{T^{3/2}}{\rho} = \frac{T_0^{3/2}}{\rho_0} = cte. \qquad (1)$$

$$\hookrightarrow \rho = \frac{Nm}{V}$$

$$PV = nRT \Rightarrow \frac{T\rho}{P} = \frac{m}{k} = \frac{T_0\rho_0}{P_0} \qquad (2)$$

de (1) y (2) $\quad \dfrac{P}{P_0} = \dfrac{T^{5/2}}{T_0^{5/2}}$

Ecuación de equilibrio $\quad \dfrac{dP}{dr} = -\rho g \qquad (3)$

de (2) $\quad P = \dfrac{k}{m}\rho T \underset{\text{con (1)}}{=} \dfrac{k}{m}\dfrac{\rho_0}{T_0^{3/2}} T^{5/2} \Rightarrow \dfrac{dP}{dr} = \dfrac{5}{2}\dfrac{k}{m}\rho\dfrac{dT}{dr}$

introduciéndolo en (3) tenemos:

$$\frac{dT}{dr} = -\frac{2}{5}\frac{m}{k}g \quad \text{con } g = g_0\left(\frac{R}{r}\right)^2$$

por tanto $\quad \dfrac{dT}{dr} = -\dfrac{2}{5}\dfrac{m}{k}g_0 R^2 \dfrac{1}{r^2}$

Para puntos en la superficie de la tierra tenemos:

$r \approx R \quad g_0 = 9{,}8\ m/s^2 \quad k$

$m = 4{,}8\cdot 10^{-23}$ gr (ver prob 3) $\Rightarrow \dfrac{dT}{dr} \approx -0{,}0136\ \dfrac{K}{m}$