58. Since the volume of the monatomic ideal gas is kept constant it does not do any work in the heating process. Therefore the heat Q it absorbs is equal to the change in its inertial energy: $dQ = dE_{\text{int}} = \frac{3}{2}nR\,dT$. Thus

$$\begin{aligned}\Delta S &= \int \frac{dQ}{T} = \int_{T_i}^{T_f} \frac{(3nR/2)dT}{T} = \frac{3}{2}nR\ln\left(\frac{T_f}{T_i}\right) \\ &= \frac{3}{2}(1.0\,\text{mol})\left(8.31\,\frac{\text{J}}{\text{mol}\cdot\text{K}}\right)\ln\left(\frac{400\,\text{K}}{300\,\text{K}}\right) = 3.59\ \text{J/K}\ .\end{aligned}$$