

Exercise 2-4

Wednesday, 22 April 2020

14:49

$$dP = \left(\frac{\partial P}{\partial v} \right)_T dt + \left(\frac{\partial P}{\partial T} \right)_v dT$$

$$= -\frac{P}{v} dv + \frac{P}{T} dT$$



$$\frac{1}{P} dP = -\frac{1}{v} dv + \frac{1}{T} dT$$



$$\ln(P) = -\ln(v) + \ln(T) + C$$



$$\ln(P) = \ln\left(\frac{T}{v}\right) + C$$



$$-C = \ln\left(\frac{T}{vP}\right)$$

$$\frac{T}{vP} = e^{-C} \rightarrow \text{take } R = e^{-C} \text{ to obtain } Pv = RT$$