Problem 2-7

If n moles of an ideal gas at the temperature 4 K can be pumped through a tube of diameter d, what must be the diameter of the tube to pump the same number of moles of gas at the temperature 300 K?

Problem 2-14

A vessel contains CO_2 at the temperature of 137 C. The specific volume is 0.07 $\mathrm{m^3 mol^{-1}}$.

1. Compute the pressure in $\mathrm{Nm^{-2}}$ (a) from the ideal gas equation, (b) from the van der Waals equation.
2. Calculate the ratio $\frac{Pv}{T}$ (in J $\mathrm{mol^{-1}K^{-1}}$), for the two pressures found above, and compare with experimental value as read from Fig. 2-1 (p. 12 of the lecture notes) assuming that T_2=137 C.

The above text contains a misprint - sorry about that. In the textbook Pr. 2.14 reads

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Problem 2-25

A substance has compressibility $\kappa = \frac{aT^3}{P^2}$ and expansivity $\beta = \frac{bT^2}{P}$ where a and b are constants. Find the equation of state of the substance and the ratio $\frac{a}{b}$.