

79. (a) The ideal gas law leads to

$$V = \frac{nRT}{p} = \frac{(1.00 \text{ mol}) \left(8.31 \frac{\text{J}}{\text{mol}\cdot\text{K}}\right) (273 \text{ K})}{1.01 \times 10^5 \text{ Pa}}$$

which yields $V = 0.0225 \text{ m}^3 = 22.5 \text{ L}$. If we use the standard pressure value given in Appendix D, $1 \text{ atm} = 1.013 \times 10^5 \text{ Pa}$, then our answer rounds more properly to 22.4 L .

- (b) From Eq. 20-2, we have $N = 6.02 \times 10^{23}$ molecules in the volume found in part (a) (which may be expressed as $V = 2.24 \times 10^4 \text{ cm}^3$), so that

$$\frac{N}{V} = \frac{6.02 \times 10^{23}}{2.24 \times 10^4 \text{ cm}^3} = 2.69 \times 10^{19} \text{ molecules/cm}^3 .$$