19A

A 1.00-mol sample of a diatomic ideal gas has pressure P and volume V. When the gas is warmed, its pressure triples and its volume doubles. This warming process includes two steps, the first at constant pressure and the second at constant volume. Determine the amount of energy transferred to the gas by heat.

19B

From the Maxwell–Boltzmann speed distribution, show that the most probable speed of a gas molecule is given by Equation 19-35. Notice that the most probable speed corresponds to the point at which the slope of the speed distribution curve dN_v/dv is zero.

19C

● ▲ A cylinder containing n mol of an ideal gas undergoes an adiabatic process. (a) Starting with the expression $W = -\int P\,dV$ and using the condition $PV^\gamma = \text{constant}$, show that the work done on the gas is

$$W = \left(\frac{1}{\gamma - 1}\right)(P_f V_f - P_i V_i)$$