

CHEM 35
General Chemistry
Quiz #4

October 6, 2000
Take-home problem set

Name: Largo, Key

1. Boyle investigated the effects of pressure changes on the volume of a gas (at a constant temperature). Indicate, either graphically or by an equation, the relationship that we now know as Boyle's Law.

Boyle found that the *product* of the pressure and the volume of a gas was **constant**: **$P \times V = \text{constant}$** .

Graphically, this means that a plot of *Pressure* as a function of $1/V$ is a straight line having a slope equal to the constant.

2. One mole of N_2 gas at 1.00 atm is heated from 0°C (273.15 K) to 100°C (373.15 K). If the gas occupied 22.41 L at 0°C , what volume does it occupy at 100°C (still at 1.00 atm of pressure)?

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

Solving for V_2 :
$$V_2 = \frac{P_1 V_1 T_2}{T_1 P_2}$$
$$= \frac{(1.00 \text{ atm})(22.41 \text{ L})(373.15 \text{ K})}{(273.15 \text{ K})(1.00 \text{ atm})}$$
$$= 30.6143 \text{ L}$$
$$= \underline{\underline{30.6 \text{ L}}}$$