#5. An ideal gas occupies 400 mL (V_1) at 270 mm Hg (P_1) and 65°C. (T_1) If the pressure is changed to 1.4 atm (P_2) and the temperature is increased to 100°C. (T_2) what is the new volume? (V_2)

Use this formula!

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

Of course, before you can use the formula, you need to convert 270 mm Hg to atmospheres, convert 400mL to Liters, and convert °C to K.

270 mm Hg = 0.35 atm

$$\frac{270 \text{ mm Hg}}{1} \cdot \frac{1 \text{ atm}}{760 \text{ mm Hg}} = 0.35 \text{ atm}$$

400 mL = _____ L

$$400 \text{ mL} \cdot \frac{1 \text{ L}}{1000 \text{ mL}} = 0.4 \text{ L}$$

65°C = _____ K

65°C + 273 = 338K

100°C + 273 = 373°K

Finally, you can substitute into the formula!

$$\frac{(0.35\ atm)(0.4L)}{338K} = \frac{(1.4\ atm)(V_2)}{373K}$$

↓ Intermediate step where I removed units to make it look nicer to solve.

$$\frac{(0.35)(0.4)}{338} = \frac{(1.4)(V_2)}{373}$$

↓ Solve for V_2

I'm going to let you do this part.

* Problem 6 is quite similar!