$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \text{OR} \quad \frac{T_1}{V_1} = \frac{T_2}{V_2}$$

HOMEWORK PROBLEMS:

3a. A sample of air with a volume of 2.25 liters is at a temperature of 298 K. If the temperature is increased to 373 K without changing the pressure, what is the new volume (in milliliters) for this sample of air?

(V_1 T_1 T_2 V_2)

$V_1 = 2.25\,L$
$T_1 = 298\,K$
$T_2 = 373\,K$
$V_2 = ?$ (in mL)

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \Rightarrow \frac{V_1 T_2}{T_1} = V_2 = \frac{(2.25\,L)(373\,K)}{298\,K}$$

$$V_2 = 2.82\,L \left| \frac{1000\,mL}{1\,L} \right. = 2.82 \times 10^3\,mL = V_2$$

USE THE EQUATION THAT HAS THE VARIABLE (YOU ARE SOLVING FOR) "ON TOP".

NOTE: NEVER LEAVE THE VARIABLE YOU ARE SOLVING FOR IN THE DENOMINATOR.

3b. As the temperature of a sample of nitrogen gas increases from 273 K, the volume of the sample changes from 275 cm^3 to 525 cm^3. Assuming that the pressure does not change, what is the final temperature of this gas?

(T_1 T_2 V_1 V_2)

$T_1 = 273\,K$
$V_1 = 275\,cm^3$
$V_2 = 525\,cm^3$
$T_2 = ?$

$$\frac{T_1}{V_1} = \frac{T_2}{V_2} \Rightarrow \frac{T_1 V_2}{V_1} = T_2$$

$$T_2 = \frac{(273\,K)(525\,cm^3)}{275\,cm^3} = 521\,K = T_2$$