Combined Gas Law Problems - Solutions

- 1) If I initially have a gas at a pressure of 12 atm, a volume of 23 liters, and a temperature of 200 K, and then I raise the pressure to 14 atm and increase the temperature to 300 K, what is the new volume of the gas?

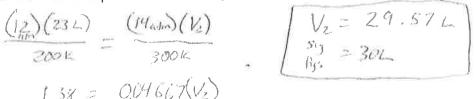
 29.6 L.
- 2) A gas takes up a volume of 17 liters, has a pressure of 2.3 atm, and a temperature of 299 K. If I raise the temperature to 350 K and lower the pressure to 1.5 atm, what is the new volume of the gas? 30.5 L
- 3) A gas that has a volume of 28 liters, a temperature of 45 °C, and an unknown pressure has its volume increased to 34 liters and its temperature decreased to 35 °C. If I measure the pressure after the change to be 2.0 atm, what was the original pressure of the gas?

 2.51 atm
- 4) A gas has a temperature of 14 0 C, and a volume of 4.5 liters. If the temperature is raised to 29 0 C and the pressure is not changed, what is the new volume of the gas? 4.74 L
- 5) If I have 17 liters of gas at a temperature of 67 °C and a pressure of 88.89 atm, what will be the pressure of the gas if I raise the temperature to 94 °C and decrease the volume to 12 liters? 136 atm
- I have an unknown volume of gas at a pressure of 0.5 atm and a temperature of 325 K. If I raise the pressure to 1.2 atm, decrease the temperature to 320 K, and measure the final volume to be 48 liters, what was the initial volume of the gas? 117 L
- 7) If I have 21 liters of gas held at a pressure of 78 atm and a temperature of 900 K, what will be the volume of the gas if I decrease the pressure to 45 atm and decrease the temperature to 750 K? 30.3 L
- 8) If I have 2.9 L of gas at a pressure of 5 atm and a temperature of 50 $^{\circ}$ C, what will be the temperature of the gas if I decrease the volume of the gas to 2.4 L and decrease the pressure to 3 atm? 160 K
- 9) I have an unknown volume of gas held at a temperature of 115 K in a container with a pressure of 60 atm. If by increasing the temperature to 225 K and decreasing the pressure to 30 atm causes the volume of the gas to be 29 liters, how many liters of gas did I start with? 7.41 L

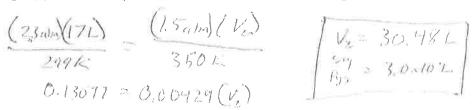
Combined Gas Law Problems

Use the combined gas law to solve the following problems:

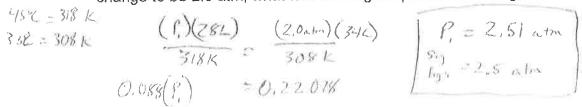
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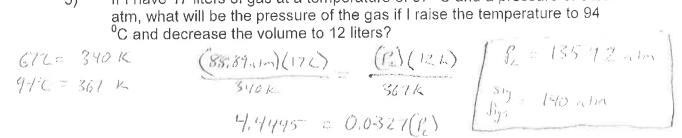
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A gas has a temperature of 14 °C, and a volume of 4.5 liters. If the temperature is raised to 29 °C and the pressure is not changed, what is the new volume of the gas?



5)

If I have 17 liters of gas at a temperature of 67 °C and a pressure of 88,89

6) I have an unknown volume of gas at a pressure of 0.5 atm and a temperature of 325 K. If I raise the pressure to 1.2 atm, decrease the temperature to 320 K, and measure the final volume to be 48 liters, what was the initial volume of the gas?

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$$\frac{(0.5 \text{ m})(V_1)}{325 \text{ K}} = \frac{(1.2 \text{ m})(482)}{320 \text{ K}} = \frac{116.88 \text{ L}}{69} = 120 \text{ L}$$

$$0.00154(V) = 0.18$$

7) If I have 21 liters of gas held at a pressure of 78 atm and a temperature of 900 K, what will be the volume of the gas if I decrease the pressure to 45 atm and decrease the temperature to 750 K?

$$\frac{(78am)(21L)}{900K} = \frac{(45am)(V_2)}{750K}$$

$$\frac{1.8L}{2} = 0.06(V_2)$$

8) If I have 2.9 L of gas at a pressure of 5 atm and a temperature of 50 °C, what will be the temperature of the gas if I decrease the volume of the gas to 2.4 L and decrease the pressure to 3 atm?

$$\frac{58C = 323k}{323k} = \frac{(5alm)(z.9L)}{7z} = \frac{(3alm)(z.9L)}{7z} = \frac{160,356 k}{5ys} = 200 k$$

9) I have an unknown volume of gas held at a temperature of 115 K in a container with a pressure of 60 atm. If by increasing the temperature to 225 K and decreasing the pressure to 30 atm causes the volume of the gas to be 29 liters, how many liters of gas did I start with?