Dalton's Law of Partial Pressure Name_____ Per_____ Date

Dalton's Law of Partial Pressure states, "The total pressure developed by a mixture of gases is equal to the sum of the partial pressure developed by the individual gases".

$$\boldsymbol{P_T = P_1 + P_2 + P_3 \ldots}$$

Where P_T is the total pressure and $P_1 + P_2 + P_3$ … are the partial pressures of the different non-reacting gases. The partial pressure may be defined as the pressure developed by a gas when it is present alone in the same container at the same temperature.

1. If carbon dioxide, nitrogen, and oxygen are in a container and exert a pressure of 760 torr, and the partial pressure of carbon dixoide is 0.285 torr, the partial pressure of nitrogen is 593.525 torr, what is the partial pressure of oxygen?

2. What is the total pressure of a container that has $NH_{3(g)}$ exerting a pressure of 346 torr, $N_{2(g)}$ exerting a pressure of 225 torr, and $H_2O_{(g)}$ exerting a pressure of 55 torr?

3. A metal tank contains three gases: oxygen, helium, and nitrogen. If the partial pressures of the three gases in the tank are 35 atm of O_2, 5 atm of N_2, and 25 atm of He, what is the total pressure inside of the tank?

4. Blast furnaces give off many unpleasant and unhealthy gases. If the total air pressure is 0.99 atm, the partial pressure of carbon dioxide is 0.05 atm, and the partial pressure of hydrogen sulfide is 0.02 atm, what is the partial pressure of the remaining air?

5. Two flasks are connected with a stopcock. The first flask has a volume of 5 liters and contains nitrogen gas at a pressure of 0.75 atm. The second flask has a volume of 8 L and contains oxygen gas at a pressure of 1.25 atm. When the stopcock between the flasks is opened and the gases are free to mix, what will the pressure be in the resulting mixture? *(Hint: Use Boyles Law to determine the final pressure of each gas in the total (added) volume and add the partial pressures.)*

6. If I place 3 moles of N_2 and 4 moles of O_2 in a 35.0 L container at a temperature of 25°C, what will the pressure of the resulting mixture of gases be? *(Hint: Use the Ideal Gas Law (PV=nRT) to solve for the pressures of each gas and add their pressures together.)*