Honors Chemistry I
Properties of Gases
Problem Set 1 **Name _____**

Show your work or give explanations for all problems!

1. A metal cylinder contains 1.00 mole of nitrogen gas at STP. How will the pressure be affected if another mole of gas is added to the cylinder but the temperature and volume do not change?

2. If a gas is compressed from 4 L to 1 L and the temperature remains constant, what happens to the pressure?

3. A gas with a volume of 4 L is allowed to expand to a volume of 12 L. What happens to the pressure in the container if the temperature remains constant?

4. Heating a contained gas at constant volume makes its pressure higher. Why?

5. The gas in a container has a pressure of 3 atm. What will be the new pressure if the container is compressed to half its original volume? Support your answer with an explanation or calculation.

6. A gas with a volume of 4.0 L at a pressure of 0.90 atm is allowed to expand until the pressure drops to 0.20 atm. What is the new volume?

7. A gas is compressed at constant temperature from 27 L to 3.0 L. If the initial pressure of the gas is 0.50 atm, what is the final pressure?

8. Five liters of air at –50ºC are warmed to 100ºC. What is the new volume if the pressure remains constant?

9. If a balloon has a volume of 22.4 liters at 0ºC, then what is its volume at 30ºC?

10. A steel cylinder of compressed oxygen gas has a pressure of 30.0 atmospheres at 27ºC. The cylinder is cooled until the pressure is only 20.0 atmospheres. What is the new temperature of the gas in the cylinder, in °C?

11. An empty can of spray paint has a pressure of 1.00 atmosphere at a room temperature of 21°C. If the can will explode when its internal pressure reaches 2.00 atmospheres, then the temperature of the can must be kept below what temperature?

12. A container with an initial volume of 1.0 L is occupied by a gas at a pressure of 1.5 atm at 25ºC. By changing the volume, the pressure of the gas increases to 6.0 atm as the temperature is raised to 100ºC. What is the new volume?