1. The atmospheric pressure in the lab was measured to be 29.22 inHg. Express this pressure in units of mmHg, torr, atm, and kPa.

Consider these two manometers:

2. Gas pressure is higher than atmospheric pressure for which one? (Circle one) left right

3. Gas pressure is lower than atmospheric pressure for which one? (Circle one) left right

4. If the height difference for the example on the left is 95 mmHg and atmospheric pressure is 725 mmHg, calculate the gas pressure.

5. If the height difference for the example on the right is 85 torr and atmospheric pressure is 0.975 atm, calculate the gas pressure.
6. Consider pressure to be a measure of the frequency of gas particles colliding against the surfaces of a container. What happens to the pressure of a gas given the following changes? (Circle one for each below.)

a. If Volume (of the container) ↑, pressure_____.$\uparrow$  $\downarrow$ stays same

   Thus, pressure and volume are _____ related. not directly inversely

b. If Temperature ↑, pressure _____. $\uparrow$ $\downarrow$ stays same

   Thus, pressure and temperature are _____ related. not directly inversely

c. If the # of gas molecules ↑, pressure _____. $\uparrow$ $\downarrow$ stays same

   Thus, pressure and # of molecules are _____ related. not directly inversely

For the exercises that follow: If a value (P, V, n, or T) is not given, assume that value remains constant. Note that temperature must be in Kelvin when solving gas laws problems!

7. A gas sample at a pressure of 1.23 atm has a volume of 15.8 cm$^3$, what will be the volume (in L) if the pressure is increased to 3.16 atm?

8. A 250.0-mL sample of helium at 722 mmHg is compressed until the new pressure is 3.60 atm. Calculate the new volume.

9. A sample of carbon monoxide occupies 3.20 L at 125 °C. If the sample is heated at constant pressure, calculate the temperature (°C) at which the gas will occupy 1.54 L.
10. When 20.0 L of hydrogen gas are heated from 25.00°C to 450.50°C, the volume changes. Calculate the new volume.

11. What is the pressure exerted by 1.00 x 10^{20} molecules of N_2 gas in a 305 mL flask at 175°C?

12. A gas sample at a pressure of 1.23 atm has a volume of 15.8 cm^3, what will be the volume (in L) if the pressure is increased to 3.16 atm?

13. If the volume of 2.67 g of SF_6 gas at 1.143 atm and 28.5°C is 2.93 m^3, what mass of SF_6 will you find in a container with a volume of 543.9 m^3 at the same pressure and temperature?
14. The air pressure in the tires of an automobile is adjusted to 28 psi at a gas station in San Diego, CA, where the air temperature is 68°F (20.0°C). The automobile is then driven east along a hot desert highway. Along the way, the temperature of the tire reaches 140°F (60.0°C). What is the pressure in the tires?

15. An inflated balloon has a volume of 0.55 L at sea level. It is allowed to rise to a height of 6.5 km, where the pressure is about 0.40 atm. Assuming the temperature remains constant, what is the final volume of the balloon?

16. A 452-mL sample of fluorine gas is heated from 22°C to 187°C at constant pressure. What is the final volume of the gas?