Pressure Conversions

Please use dimensional analysis wherever applicable!

1. The air pressure in a tire is 109 kPa. What is this pressure in atm?

2. The air pressure inside a submarine is 0.62 atm. What would the height of a column of mercury have to be to equal this pressure?

3. The local weather station says the atmospheric pressure is 1.07 atm. What is this pressure in Torricellis?

4. An experiment was performed at Sandia National Laboratories in New Mexico at an atmospheric pressure of 758.7 mm Hg. What is this pressure in atm?

5. A bag of potato chips is sealed in a factory near sea level. The pressure inside the factory is 761.3 mm Hg. Assuming the pressure inside the bag is the same, what is this pressure in Pa?

6. The same bag of chips from problem 5 is shipped to a town in Colorado, where the atmospheric pressure is 99.82 kPa. What is the pressure difference (in Pa) between the pressure in the bag and the pressure of the Colorado town?

7. The gauge on a compressed air tank reads 43.2 lb/in^2. What is this pressure in atm?

8. The pressure in the tire of a car is 34.8 lb/in^2. What is the pressure in kPa?

Manometer Problems

You must draw a complete manometer diagram with each problem!

9. A gas container is fitted with a manometer. The level of the mercury is 15 mm lower on the open side. Using a laboratory barometer, you determine the atmospheric pressure to be 750 mm Hg. What is the pressure, in atm, of the gas in the container?

10. A soccer ball is attached to an open-ended manometer. The mercury level in the manometer is 10 mm higher on the side attached to the ball than on the side open to the atmosphere. Atmospheric pressure has been determined to be 770 mm Hg. What is the pressure inside the ball?

11. One end of an open-ended manometer is connected to a canister filled with a gas at a pressure of 771.0 mm Hg. The mercury level on the side open to the atmosphere is 11.2 mm higher than on the side connected to the canister. What is the atmospheric pressure in mm Hg?

12. Suppose you are measuring the pressure inside a sealed cabinet using an open-ended manometer. The atmospheric pressure is 762.4 mm Hg. If the mercury level on the side open to the atmosphere is 3.6 mm higher than the side attached to the cabinet, what is the pressure inside the cabinet in units of kPa?

13. The U-tube of a manometer is 26.4 cm tall. With both ends open, it is filled until the Hg level in each side is 13.2 cm from the top. What is the largest difference in pressure this manometer can measure in units of mm Hg?

14. A manometer contains a sample of nitrogen gas at a pressure of 88.3 kPa. The level of Hg in the U-tube is 12.8 mm lower on the end open to the atmosphere. What is the atmospheric pressure in kPa?

15. One end of an open-ended manometer is connected to a canister of unknown gas. The atmospheric pressure is 1.03 atm. The mercury level is 18.6 mm higher in the U-tube on the side open to the atmosphere than on the side attached to the canister. What is the pressure in mm Hg?