Name _____

Unit 2 Worksheet 3 – PVTn Problems

On each of the problems below, start with the given P, V, T, or n; then make a decision as to how a change in P, V, T, or n will affect the starting quantity, and then multiply by the appropriate factor. **Draw particle diagrams** of the initial and final conditions.

1. The pressure in a bicycle tire is 105 psi at 25˚C in Fresno. You take the bicycle up to Huntington, where the temperature is – 5˚C. What is the pressure in the tire? (V and n = constant)

2. What would be the new pressure if 250 cm^3 of gas at standard pressure is compressed to a volume of 150 cm^3 ? (T and n = constant)

3. A sample of gas occupies 150 mL at 25 ˚C. What is its volume when the temperature is increased to 50˚C? (_____= constant)

4. What would be the new volume if 250 cm^3 of gas at 25˚C and 730 mm pressure were changed to standard conditions of temperature and pressure? (_____= constant)

5. Sam's bike tire contains 15 units of air particles and has a volume of 160mL. Under these conditions the pressure reads 13 psi. The tire develops a leak. Now it contains 10 units of air and has contracted to a volume of 150mL). What would the tire pressure be now?

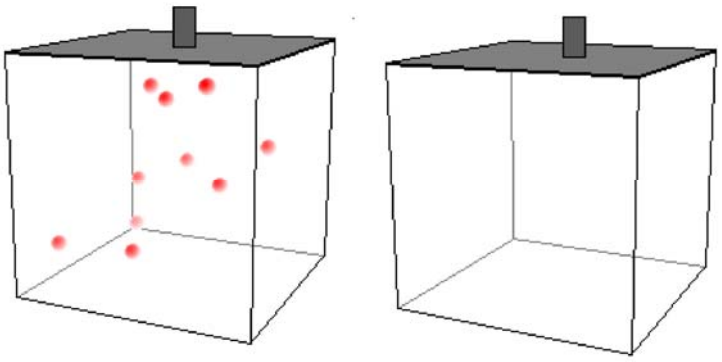
6. A closed flask of air (0.250L) contains 5.0 "puffs" of particles. The pressure probe on the flask reads 93 kPa. A student uses a syringe to add an additional 3.0 "puffs" of air through the stopper. Find the new pressure inside the flask.

7. A 350 mL sample of gas has a temperature of 30˚C and a pressure of 1.20 atm. What temperature would needed for the same amount of gas to fit into a 250 mL flask at standard pressure?

8. A gas sample enclosed in a 1.8L container contains 6.0 "puffs" of particles at 14°C and 2.8atm of pressure. If the container was expanded to 3800mL and the pressure was increased to 2500mmHg, then how many "puffs" of particles would have to be in the container to ensure that the temperature would increase to 22°C?

9. A 475 cm^3 sample of gas at standard temperature and pressure is allowed to expand until it occupies a volume of 600. cm^3. What temperature would be needed to return the gas to standard pressure?

10. The diagram below left shows a box containing gas molecules at 25˚C and 1 atm pressure. The piston is free to move.



In the box at right, sketch the arrangement of particles and the position of the piston at *standard* temperature and pressure. Does the volume decrease significantly? Why or why not?