

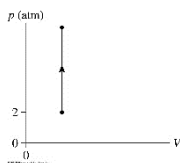
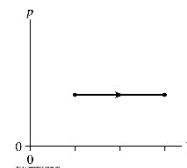
# AP 2 Thermodynamics WS 3

Name: \_\_\_\_\_ Period: \_\_\_\_\_



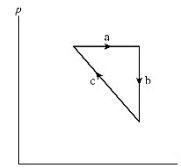
Every mathematician knows it is impossible to understand any elementary course in thermodynamics – [Vladimir Arnold](#), “Contact Geometry: the Geometrical Method of Gibbs’ Thermodynamics” (1989)

1. A gas undergoes the process shown in the figure. By what factor does the temperature change?



2. The temperature increases from 300K to 1200 K as a gas undergoes the process shown in the figure. What is the final pressure of the gas?

3. A student is asked to sketch a PV diagram for a gas that goes through a cycle consisting of a) an isobaric expansion, b) a constant-volume reduction in temperature, and c) an isothermal process that returns the gas to its initial state. The student draws the diagram shown in the figure. What if anything is wrong with the student’s diagram?

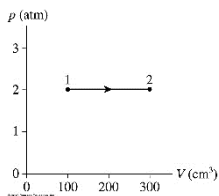
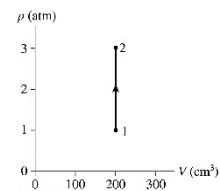


4. A gas with initial state variables  $p_1$ ,  $V_1$ , and  $T_1$  expands isothermally until  $V_2 = 2V_1$ . What are (a)  $T_2$  and (b)  $p_2$ ?
5. A gas with initial state variables  $p_1$ ,  $V_1$ , and  $T_1$  is cooled in an isochoric process until  $p_2 = \frac{1}{3} p_1$ . What are (a)  $V_2$  and (b)  $T_2$ ?

6. 0.10 mol of argon gas is admitted to an evacuated 50 cm<sup>3</sup> container at 20°C . The gas then undergoes an isochoric heating to a temperature of 300°C . a) What is the final pressure of the gas? b) Show the process on a  $pV$  diagram. Include a proper scale on both axes.

7. 0.10 mol of argon gas is admitted to an evacuated 50 cm<sup>3</sup> container at 20°C . The gas then undergoes an isobaric heating to a temperature of 300°C . a) What is the final volume of the gas? b) Show the process on a  $pV$  diagram. Include a proper scale on both axes.

8. 0.0040 mol of gas undergoes the process shown in the figure.  
 a. What type of process is this?  
 b. What are the initial and final temperatures in °C ?



9. A gas with an initial temperature of 900°C undergoes the process shown in the figure.

- a. What type of process is this?  
 b. What is the final temperature in °C ?  
 c. How many moles of gas are there?

10. 0.020 mol of gas undergoes the process shown in the figure.

- a. What type of process is this?  
 b. What is the final temperature in °C ?  
 c. What is the final volume  $V_2$ ?

