

Week 04

Group: _____

1. (20 points) A monatomic ideal gas expands from 3.0 l to 4.0 l along a process defined by

$$P = a/V^2 \quad a = 10.0 \text{ atm l}^2 \quad (l = \text{liter})$$

The initial temperature of the ideal gas is 300 K .

- a. (2 points) Express 1 atm l in terms of SI units.
- b. (4 points) Determine the initial and final pressure of the gas and sketch the process in a P - V diagram.
- c. (2 points) Calculate the number of molecules of the gas. How many moles does that correspond to?
- d. (2 points) Determine the final temperature of the gas.

e. (2 points) Calculate the change in the internal energy of the gas.

f. (4 points) Determine the net work done on / by the gas during this process.

g. (4 points) Determine the net heat flow into / out of the gas during this process. Does the direction of heat flow make sense? (Compare the given process to adiabatic and isothermal processes.)