

PHY 3513 Fall 2000 – Homework 4

Due at the start of class on Friday, September 29.

Answer all questions, including any additions to textbook problems. To obtain full credit, you must explain your reasoning and show all working. Please write neatly and include your name on the front page of your answers.

1. Callen Problems 2.2-1 and 2.2-3. These problems are closely related and should be thought of as a single, multi-part problem. In the second part, you should find an algebraic expression for $P(T, V, N)$. Use this result to deduce the shape of the isotherms that you are asked to draw.
2. Callen Problem 2.3-5. The fundamental equation given by Callen is dimensionally incorrect. Before doing the problem, fix up the equation by inserting appropriate factors of R , θ , and v_0 (positive constants which have units of entropy/mole, temperature, and volume/mole, respectively).
3. Callen Problem 2.6-4. Work with symbols (instead of numbers) until the last possible moment.

Hint: Before attempting the assigned problem, you might want to see whether you can reproduce the result Callen gives for Problem 2.6-3. (Don't turn in the practice problem, though.)

4. Callen Problem 2.7-2. Please derive a purely symbolic form for each answer, and only then substitute values to get a numerical answer.