CHEM 450/450G HW #2

Reading: Chapters 2.5-2.14, 3.1-3.8, and 4.1-4.5. Sounds like a lot, but they are pretty short sections.

Hand in:

Q 2.4 (3 points)

P 3.31 (2 points), 3.37 (4 points)

Extra Credit: 2.41

Notes: In general, if you make an assumption (such as “reversible” or “adiabatic”), you will need to justify it unless the problem explicitly tells you to make that assumption. Be on the lookout for hints in the wording: sometimes a single phrase like “at constant volume” will provide you with a huge simplification!

P2.41: You might be able to work this out using the equations from Lab 1; this might get you a small number of points. For a more thorough answer (and full score), use Eqs. 2.46 and 2.47 from the text.

Practice:

Q 2.1, 3.9, 4.12, 4.14

P 2.31, 2.53, 3.2, 3.24, 3.36, 4.6, 4.12, 4.33

See next page for additional practice on partial derivatives.

Notes:

Q2.1: A great reminder that you must always establish clearly what your system and surroundings are before you can determine heat and work.

P2.31: A classic exam-type question!

Consider the following function, *f(x,y)*:

$$f(x, y) = y\cos x - x\sin y$$

Calculate all of the following partial derivatives:

a. $\left(\dfrac{\partial f}{\partial x}\right)_y$

b. $\left(\dfrac{\partial f}{\partial y}\right)_x$

c. $\left(\dfrac{\partial^2 f}{\partial x^2}\right)_y$

d. $\left(\dfrac{\partial^2 f}{\partial y^2}\right)_x$

Then, determine if *f(x,y)* is a state function by evaluating the truth of the equality below:

$$\left(\frac{\partial}{\partial y}\left(\frac{df(x, y)}{dx}\right)_y\right)_x \stackrel{?}{=} \left(\frac{\partial}{\partial x}\left(\frac{df(x, y)}{dy}\right)_x\right)_y$$