PHYS 328
HOMEWORK #6
Due : 10 October 2013

1. Consider the problem of the two dimensional random walk. A particle is constrained to move in the x - y plane in such a way that each step is of the same length L, but that the angle between successive steps is randomly oriented. Use methods of vector analysis to show that if the particle makes N steps (where N is very large), the scalar displacement D from the origin will be given by :

$$D = \sqrt{N} \, L$$

(Do not use the techniques of Chapter 2 for this problem; use what you know of the properties of vectors.)

2. Starting with the expression for the multiplicity of states of an ideal gas (Eq. 2.40 in the text) use Stirling' s Approximation as appropriate and derive the Sackur - Tetrode equation (Eq. 2.49)

3. Problem 2.28 text.

4. Problem 2.29 text.

5. Problem 2.34 text.

6. Problem 3.5 text.