Appendix C: Volume of a sphere in D-dimension

$$V_D(R) = \frac{\pi^{D/2}}{\Gamma\left(\frac{D}{2}+1\right)} R^D$$

Volume of D-dimensional hypersphere with radius R

E.g. $D=3$ (3D sphere)

$$V_3(R) = \frac{\pi^{3/2}}{\Gamma\left(\frac{3}{2}+1\right)} R^3 = \frac{\pi^{3/2}}{\frac{3}{2}\Gamma\left(\frac{3}{2}\right)} R^3 \qquad ; \Gamma(n+1) = n\Gamma(n)$$

$$= \frac{\pi^{3/2}}{\frac{3}{2}\cdot\frac{1}{2}\Gamma\left(\frac{1}{2}\right)} R^3 \qquad ; \Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$$

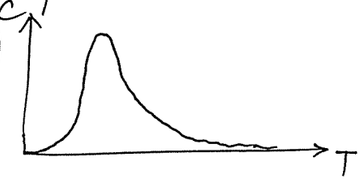
$$= \frac{4}{3}\pi R^3 \quad \#$$

See Sample Question for a proof.

Appendix D: Standard Microcanonical Ensemble Problems

- Collection of oscillators
  - heat capacity of solids (Einstein model)
    (unbounded single-particle spectrum)

- "Two-level" Systems
  - Schottky defects and other defect problems
    (bounded single-particle spectrum)
  - Paramagnetic property of solids
  - amorphous solids



- Classical ideal gas and its validity
- Polymer chain