Homework 8

Due Sunday, April 14th at 6pm

Read Boas Ch. 6, §11, Ch. 2, and Ch. 14, §§1-3.

1. Boas 6.10.2
2. (**a**) In class we proved that by picking particular functions for Q and P we could express the area of a two-dimensional region in terms of a line integral over the boundary of that region using Green's theorem. Using our three-dimensional results find a similar formula that expresses the volume of a three-dimensional region in terms of a two-dimensional integral over its boundary. (Gavin showed us this, but I want you to think through it yourselves too.)
   (**b**) Apply your new theorem to find the volume of a sphere.
3. (**a**) Boas 6.10.7 & (**b**) Boas 6.10.11. She doesn't say it here, but you are supposed to think of $\vec{B}$ as a magnetic field and $\vec{A}$ as a vector potential for this magnetic field.
4. Boas 6.10.16
5. Boas 6.11.2
6. (**a**) Boas 6.11.7 & (**b**) Boas 6.11.8
7. Do any three parts of 6.11.17 (you don't have to do all of them).