Assignment 5 PHGN361

Homework due Feb. 21

- 1. Chapter 3 problems 5 (this should get you the result at the top of page 120 and then the rest follows from there),
 - 15 (your answer should be a double sum over odd integers; follow example 3.5),
 - 17 (we got the answers in chapter 2),

19,

22 (you should get the following as the last B coefficient $B_5 = \frac{\sigma_0}{\epsilon_0} R^7/16$ and the following as the last A coefficient $A_5 = \frac{\sigma_0}{\epsilon_0 R^4} \frac{1}{16}$),

23 (the solution should have a constant $+ \ln(s) + \text{sum on } \cos(k\phi)$ and $\sin(k\phi)$ with coefficients of s^k and s^{-k}),

- 24 (follow ex 3.8 but with different coordinate system).
- 26 (ans/hint quadrupole term: $\frac{k\pi^2 R^5}{4\pi\epsilon_0 48z^3}$),
- 28 (ans/hint part b: $\frac{kR^3\cos\theta}{3\epsilon_0r^2}$),
- 29 (V_{oct} is proportional to $(5\cos^3\theta 3\cos\theta)$),
- 2. Explain in words how you would find the capacitance per unit length of an infinite square metal channel inside a larger square metal channel. You found the voltage for this problem in the last assignment using an Excel spreadsheet.