

Physics 263: BTM Problem Set #5

This assignment is designed to give you practice in the basics from Chapter 3 in BTM. Please ask questions! It is due by 5:30pm in the box in 1011 on Friday, April 14.

1. **BTM Problem 3.1.2.** Just a reminder how partial derivatives work.
2. **BTM Problem 3.1.5.** A bread-and-butter Lagrange multiplier problem that you can check independently.
3. **BTM Problem 3.1.6.** The area maximization problem from chapter 1 (discussed in class) revisited with Lagrange multipliers.
4. **BTM Problem 3.2.2.** Finding the area of a circle the hard way (i.e., in Cartesian coordinates).
5. **BTM Problem 3.2.3.** Derivation by pictures of the Jacobian for spherical coordinates.
6. **BONUS:** Consider a generalization of the problem 3 (BTM 3.1.6). You are building a three-dimensional box from a given piece of cardboard with area A . Find the maximum volume that can be enclosed.