

Physics 263: BTM Problem Set #12

These problems are from BTM Chapter 7, “Vector Calculus,” covering line and surface integrals (briefly!) and then beginning gradients. Please ask questions! The problems are due by 5:30pm in the box in 1011 on Wednesday, May 11 (delayed one day because of midterm and Smith lecture).

1. **BTM Problem 7.4.2.** A basic line integral.
2. **BTM Problem 7.4.3.** More line integral practice.
3. **BTM Problem 7.4.4.** Just a warm-up for future surface integrals.
4. **BTM Problem 7.5.1.** Calculate the gradient of a hemisphere and check your intuition for how that relates to the “steepness” of the dome.
5. **BTM Problem 7.5.7.** Practical application of the gradient to keep from getting burned.
6. **BONUS: BTM Problem 7.5.4.** Relating gradients in other coordinate systems to the orthogonality of cartesian coordinates. You should look at Problem 7.5.3 first.