

Physics 263: BTM Problem Set #3

This assignment is designed to give you practice in the basic integration tools from Chapter 2 in BTM, which we'll need repeatedly and build upon. Please ask questions! It is due by 5:30pm in the box in 1011 on Friday, April 7.

1. **BTM Problem 2.1.2.** Bread-and-butter integration by parts problem.
2. **BTM Problem 2.1.3.** Evaluate a special case of the gamma function (denoted $\Gamma(z)$ in general but used here for z an integer) using integration by parts. Using the integral representation, we can extend the definition of a factorial to non-integer values.
3. **BTM Problems 2.2.1 and 2.2.2.** Basic trigonometry substitutions for practice.
4. **BTM Problem 2.2.6.** Interpreting area in terms of integrals. Be sure to draw a sketch first and use symmetry in simplifying your task.
5. **BTM Problem 2.2.9.** This is a standard example of rewriting an integrand as the derivative with respect to a parameter (*not* the integration variable), to change it to a known integral. After doing the integral, then the derivative is applied to the result.