

Turn in starred problems (and only those) on Tuesday 09/23/2007.

Multiple-page homework must be STAPLED when handed in.

Section 4.5

- 8
- 9*

Section 4.6

- 1
- 2* (see instructions in Remark 2 below)
- 5 (a)*
- 6
- 12 (a), (c), (i)*, (l)
- 16

Remarks: 1. Problem 4.5.9 has two parts: you are first asked to express $\Gamma(1/2)$ in terms of the *Gaussian integral* $\int_0^\infty e^{-u^2} du$, then to evaluate this integral. Gaussian integrals like this are important in various applications, and it is nice to know the standard trick (explained in the problem) for evaluating them. For example, the normal distribution of a random variable is important in all statistical considerations, and to work with these distributions you need to know the value of a Gaussian integral.

2. In solving 4.6.2, don't just plug into the given series for $J_{\pm 1/2}$. Rather, start from the beginning of the Frobenius method. In the process, verify that there is no logarithm in the second solution.

3. At the bottom of page 241 the book explains how to check your solutions to problem 12 using Maple, but if you try this with 4.6.12(c) the answer given does not contain Bessel functions? Why not? See problem 4.6.5(c) for help. (This is not to be turned in—just to be thought about.)

4. I don't expect you to work out 4.6.16 in detail, but take a look. This is another example of a concrete physical problem needing Bessel functions for its solution.