

Problem Set #8

Due Wednesday, November 14, 2007

1. RHB Problem 18.1
2. RHB Problem 18.2.
3. RHB Problem 18.8.
4. The Bessel functions $J_\nu(z)$ for integer ν can be obtained from the generating function

$$G(z, h) = \exp\left[\frac{z}{2}\left(h - \frac{1}{h}\right)\right] = \sum_{n=-\infty}^{\infty} J_n(z) h^n$$

Use the generating function to show that it yields the same results as Eq. (18.79) (3rd edition) for $J_0(z)$, $J_{\pm 1}(z)$ and $J_{\pm 2}(z)$ and verify the fact that $J_{-\nu}(z) = (-1)^\nu J_\nu(z)$ for these functions.

Hint: Use what you know about the power series for exponential functions rather than developing a power series in terms of the derivatives of $G(z, h)$.

Additional problem for practice -- **REQUIRED FOR PH561 STUDENTS!**

5. RHB Problem 18.5.