1. Consider the linear operator $Lu(x) = -u''(x) + k^2u(x)$ on $[0, L]$ with Dirichlet BC where $k$ is a real number. Write the Green’s function for

$$-u''(x) + k^2u(x) = f(x), \quad k \in \mathbb{R}$$

two different ways. First, use the eigenfunction expansion for the Sturm-Liouville problem for $L$. Second, use the variation of parameters method. How are the two representations related?

2. Arfken, chapter 5, page 268, problems 5.1.6 and 5.1.7.

3. Arfken, chapter 5, page 274, problem 5.2.4.