

MATH 445 ASSIGNMENT 9
Fall 2009
Prof. Alexander

Due Wednesday November 4.

Kreyszig:

12.6 p. 568 #1, 3, 6, 10ef

12.8 p. 578 #5, 7, 13, 17, 18, 23

12.9 p. 585 #5, 11, 17, 18, 25

Some hints:

(12.8 #17) For $a = 1, b = 3$ we found in lecture that λ_{36} and λ_{29} were both equal to $\sqrt{13}$, so there were two different eigenfunctions of the form of (10) p. 574 for this eigenvalue—one with $m = 3, n = 6$, the other with $m = 2, n = 9$. You're asked to do the same thing with $a = 2, b = 1$.

(12.6 #10e) erf is defined at the bottom of p. 568. Since the bell curve $\varphi(w) = e^{-w^2}$ is symmetric, the integral in (21) is the same as the integral from $-x$ to 0.

(12.9 #5) If u doesn't depend on θ , what happens to the third term on the right side of (5) p. 580? This means you have an ordinary differential equation, not a PDE, and you can solve it by basic Math 245 methods.

(12.9 #11) You can assume (20) in problem 6b.

An even-numbered solution:

$$(12.6 #6) u(x, t) = \frac{2}{\pi} \int_0^{\infty} \frac{\sin p - p \cos p}{p^2} \sin px e^{-c^2 p^2 t} dp.$$