

Math 319 - Differential Equations II
Pre-Reading Assignment # 9
due 10am Tue Oct 14th, via email

Reading The reading material today is review:

1. the last two pages of the notes from last class (Thu Oct 9th)
2. the top of p 586 in your text (orthogonal expansions)

Question Doing these question will help you with the newest problem on assignment #3 (already posted), and with two key ideas in the next lecture. Both questions are very short!!! If you can set aside half an hour to do this assignment, you should have no trouble finishing it.

1. Mathematically, what does it mean to say that the set of functions below is orthogonal on the given interval with respect to the weight function $w(x) = 1$?

$$\{\sin(\eta n)\}_{n=1}^{\infty} \quad 0 \leq x \leq a$$

Note: Don't show orthogonality, just write out the definition for this problem.

2. Consider the heat equation $u_t = D\nabla^2 u$, defined on a rectangular domain with nonzero boundary and initial conditions. Assume that $u(x, y, t)$ tends to a steady state solution as t gets very large. Once the steady-state has been reached, what is the governing PDE?