Differential Equations Test IV Overview

As always your first best line of defense is to complete and understand the Problem Set, Practice Homework and lecture examples. This test is entirely take-home. In fact, Test IV is the same as Problem Set IV. If you get 100 on the Problem Set IV then you have nothing to do for Test IV. Otherwise, you have 2 days from the time I return your graded Problem Set IV. You should resend me all your work organized in such a way that it is easy for me to tell which parts have been re-worked.

1. be able to separate variables for appropriate PDEs. This reduces the problem of solving a single PDE into the problem of simultaneously solving a couple of related ODEs.

2. be able to apply boundary conditions to the separated solution, this greatly cuts down the class of possible solutions for the given problem. Usually it will guide us to find eigenvalues which are indexed by the natural numbers.

3. be able to construct general formal solutions and then be able to apply initial conditions to the infinite sum of eigen-solutions. In order to make the needed comparison we find that it is imperative to find the Fourier expansion of the given initial conditions.

4. be aware there are several different Fourier expansions, the general sine and cosine mixed expansion, the Fourier sine series and the Fourier cosine series. Which is best to use depends on the problem. Hopefully I have given enough examples you can follow my lead.

5. do not try to copy formulas from my work. Think it out for yourself. The Problem Set problems are not entirely the same as my examples. You need to think. The general framework of my solutions ought to apply.