Math 4163 — Review for Final Exam

The final exam is comprehensive. The material it will cover is the same as that listed on the review sheets for the first three exams, along with section 8.3. To review the material in chapters 2, 3, 4, 5, and 7, you can use the review sheets for the first three exams. Below is a summary of what we covered in chapter 8.

8.2. Heat flow with nonhomogeneous conditions. This section begins with a discussion of some simple special problems, which you actually don't need to read because all these problems can be handled as well by the method explained in section 8.3.

One useful portion of this section, though, is the paragraph on "Related homogeneous boundary conditions" at the end of the section, explaining how the inhomogeneous heat equation with inhomogeneous boundary conditions for u can be transformed into an inhomogeneous heat equation with homogeneous boundary conditions for a different unknown v. This is a first step you may have to take before you can use the method of section 8.3.

8.3. Method of eigenfunction expansion with homogeneous boundary conditions. At the end of section 8.2 it was explained how to transform a problem with inhomogeneous boundary conditions into a new problem with homogeneous boundary conditions (though in the new problem, the heat equation itself will still be inhomogeneous).

Now in section 8.3 it's explained how to solve the inhomogeneous heat equation with homogeneous boundary conditions. We covered this method in class. You should review the entire section, and look a little at the exercises. Notice, for example, that in the exercises you're asked to apply the same method with different boundary conditions (say, Neumann instead of Dirichlet boundary conditions).