## Math 330 Reading Questions

Sections 2.5.1 and 2.5.2

Answer the following questions as you read the textbook. This sheet will be collected at the beginning of class on Tuesday. Your answers will be graded for completeness.

1. The problem presented in Section 2.5.1 has four nonhomogeneous boundary conditions, and thus cannot be solved by separation of variables. How does the text get around this difficulty?

2. When separation of variables is applied to solve for  $u_4(x, y)$ , what are the two ODEs that must be solved?

3. What is the infinite series solution for  $u_4(x, y)$ ? How are the coefficients  $A_n$  determined?

4. In Section 2.5.2, what *boundedness* and *periodicity* conditions are required for Laplace's equation on a circular disk?

5. After separating variables, what boundary value problem arises from Laplace's equation on a circular disk? (State both the ODE and the boundary conditions.)

6. What are the eigenvalues and corresponding eigenfunctions for the boundary value problem you identified in #5?

7. The r-dependent problem results in an ODE that goes by what name(s)? What clever observation leads to a solution?

8. What is the infinite series solution for  $u(r, \theta)$ ? How are the coefficients determined?