

## Assignment for Final Paper

*This is an optional assignment. If you write a satisfactory paper along the lines described here, then you will receive an additional 0.3 grade points. Your paper should be about 6–typed pages long. The paper is due on Tuesday, June 5, 2007*

The paper consists of two parts.

The first part of your paper is the major part. Its focus should be the table on p. 164 of Chapter 3 in which the list of pairs of Discrete and Continuous Objects is defined. Your overall job is to explain and illustrate this table so that another student in this class would understand the main idea being illustrated by this table—which it different from the specific concepts listed in the table.

Among the issues you should touch on are:

1. What is the basic idea of a pairing of discrete and continuous objects? Illustrate what you are saying by some examples.
2. What is gained by such a table? *Be as specific as you can here.*
3. The notion of a limiting case comes up in connection with many of these pairs. Explain and illustrate this idea in terms of statements like, “a circle is an infinite-sided polygon.” What is gained by this idea.
4. The notion of a limit comes up in the discussion of many of these pairs. Explain and illustrate how and why this is.
5. Whenever the notion of limit comes up, its cousin “approximation” also comes up. How and why is this? How are approximation and limit connected in most people’s minds? How accurate, valid, or helpful is this?
6. What are some of the interesting distinctions and contrasts that occur to you as you look down through this list? Sure, we all know that these pairs are all supposed to be parallel, even the same. But how are they different?
7. What are some of the confusions and misconceptions that tend to develop around the items on this table among students in M497? How does one avoid falling into them?

*Of course, you don’t need to touch upon all of these issues, but enough of them should appear in your paper to give it some weight.*

The second part of your paper, which should be at least one page long, is about the relationship between the mathematical ideas expressed in the table on p.164 and the material in Chapters 4–5 of the book. What connections, if any, exist between the mathematical ideas of Chapters 1–3 and those of Chapters 4–5? *Should* there be a table for Chapters 4–5? If not, what is the core idea of these chapters and how is this related to the ideas in the table—if it is?