

## History of Mathematics

Math 570, Spring 2006

**Instructor:** Dr. Julie Bergner

**Class:** MWF 8:30 am, Cardwell 145

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**Course Web Page:** <http://www.math.ksu.edu/~jbergner/math570s06.html>

**Office hours:** MWF 9:20-10:20 am, or by appointment

**Textbook:** *The History of Mathematics: An Introduction*, by David M. Burton. You will also have two packets of readings, the first of which should be picked up from the Arts and Sciences Copy Center as soon as possible.

**Course Objectives:** The purpose of this class is to gain an understanding of the development of mathematical ideas. We will discuss various concepts as they developed over time and in different cultures, and how they have changed over time. We will focus primarily on the growth of secondary mathematics, specifically algebra, geometry, trigonometry, and calculus. This choice is partly due to the fact that many of you are seeking secondary or middle-level certification, and also so that we are studying the development of mathematical ideas that you are likely to have seen before, rather than more advanced topics.

Some important points to remember as we go along are the following. While mathematics is universal, it is also a human activity. Therefore, the history of mathematics is shaped by the culture in which it develops. For this reason, we will discuss not only the history of mathematics, but also more general historical events in the relevant places and time periods. Furthermore, it is also important to notice that the growth of mathematics is driven both by conceptual changes and by consolidation of ideas as more techniques are developed.

**Grades:** Grades will be based on the following:

1. Class preparation (reading and short response papers) and participating in class discussion
2. Weekly mathematical homework assignments
3. 3-5 short papers on the development of mathematical ideas
4. Research paper on some aspect of mathematics and culture

5. Midterm exam (tentatively Friday, March 17)
6. Final exam (Friday, May 12, 11:50-1:40 pm)

**Readings:** We will be reading a variety of original texts in this course in order to understand how mathematics was understood in various times and cultures in the past. (This class is part of the Certificate Program in Primary Texts.) There is a packet of readings available for you to pick up in the Arts and Sciences Copy Center, and there will be another later in the semester. There will usually be one or two readings assigned in a given week, and there will be a short reflection question accompanying each. It is important that you have thought critically about the readings before class!

I will also suggest supplementary readings in the textbook as we go along. You will generally find the textbook easier to read than the primary texts, so it may help you to grasp what is going on. However, Burton often oversimplifies material and is not always accurate in presenting techniques used in the given time period. For this reason, the focus of the course will be on the primary texts, but the textbook may be useful for making connections with more modern ways of thinking about mathematics.

**Homework:** There will be mathematical assignments due approximately once a week. You will be asked to solve problems using various historical methods rather than the modern ones you are familiar with. In this way, you can gain an appreciation for different techniques and ways of thinking about problems. Late homework will not be accepted.

**Concept papers:** You will be asked to write a few short (500-1000 word) essays on the development of mathematical concepts such as number, variable, algebra, function, and proof. The purpose of these papers is to give you the opportunity to think critically about the given concepts and to compare and contrast historical notions with modern ways of thinking about them. These topics will also provide an opportunity to discuss applications of these concepts to current educational standards.

**Research project:** There will be one (2000-5000 word) research paper, due near the end of the semester, on some aspect of mathematics and culture. Some ideas for the project include further researching a topic covered in class, investigating the mathematical achievements of other civilizations or cultures not covered in class, or learning about a more modern mathematical development or mathematician. You may find the textbook a good starting point to look for ideas, and I am happy to give suggestions for possible topics or references. You will be required to submit a topic and then a first draft or outline at various points in the the semester. More details will be given in the weeks ahead.

**Exams:** Both the midterm and the final exam will be based on the homework (i.e., math problems) and the readings and class discussions (short answer problems and essays). Before each exam I will make a practice test available to give you an idea of the format. The exams will be given under the honor code. Please be aware that travel plans are not a sufficient excuse to make up an exam.

**Notices:** Plagiarism and cheating are serious offenses and may be punished by failure on the exam, paper, or project, failure in the course, and/or expulsion from the University.

If you have any condition, such as a physical or learning disability, which will make it difficult for you to carry out the work as outlined above or which will require academic accommodations, please notify me in the first two weeks of the course.

**A Final Note:** This class is probably very different from any mathematics course you have taken before! Should you have concerns about the course or questions about the material, please do not hesitate to talk to me, either in class or in my office. Feel free to call me, e-mail me, or even drop by my office to get help when you need it.