

**"History of Mathematics**  
Florence Fasanelli, PhD  
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May 21, 2012 – June 8, 2012, 2:30-4:50 NYU

**Required Books:**

Textbook: Victor J. Katz, *A History of Mathematics: An Introduction* (2<sup>nd</sup> e., Harper Collins, 1998). In my opinion this is the best one-volume history in existence and it is definitely a book you should keep for reference for all of your mathematics courses.

A packet of materials will be handed out as the course proceeds. It should be kept in a three-ring binder with a Table of Contents annotated to make them easy to use in your classes. Each article in the packet is required reading.

**Method of Study:**

There will be a lot of reading, so you should begin right after each class. Each class you will be given a choice of exercises to solve. You should attempt the ones you think will be difficult. If at all possible you should solve these exercises with another student after you have made an attempt. Each student should then write them up separately (ideally on the computer) and hand them in at the beginning of class on a paper which you can then insert in your three ring binders. Please include your thoughts about your solution as well as the solution. Each student will have a copy of all solutions.

Take notes on your reading in a journal (which can be on line) so you can have a quick way to refresh your memory about what you have read and reflect on it as the course progresses.

As you take notes you will find it useful to have a world map (there is one in Katz) and a time line. The time line should be very long, several feet, as you will want to fill in lots of information.

**Classes:**

Each class will have a lecture on specific topics for which you will want to keep notes; an hour of hands-on activities; and some presentations by students of exercises done for the course. There will be ample time for discussion. The order will vary.

**Aims of the Course:**

1. To provide an overview of mathematics that will enable you to see how all your study of mathematics fits together.
2. To enable you to recognize that mathematics is a driving force of our culture through both pure and applied mathematics.
3. To give you ideas where you can use the history of mathematics to enhance your students' understanding as they learn mathematics.
4. To fill in gaps in your understanding of mathematics as you learn new mathematics
5. To practice oral and written communication among peers that will increase your teaching skills.

6. To increase your critical skills in using web and library resources for mathematical research.

### Topics and Assignments

- May 21 Introduction to the book and the course, sources and resources.  
Reading for next class: Katz pages 1-45 and 332-341
- May 22 Babylonian and Egyptian Mathematics. Mathematics in Africa, the Americas and the Pacific.  
Two-four exercises chosen from pages 44-45  
Reading: Katz selections from 46-101
- May 23 Pythagoras and Euclid  
Website: <http://aleph0.clarku.edu/~djoyce/java/elements/trip.html>  
Exercises: pages 96-99  
Reading: Katz, 102-134
- May 24 Rare books at Butler Library, Columbia University  
Archimedes  
<http://www.youtube.com/playlist?list=PLF7BD2B59299FAB84>  
Exercises: pages 129-133  
Reading: Katz, 192-287 selections (6.3.1, 6.4, Sidebar 6.1, 6.6.1, 6.8, 6.9, Summary page 237, pages 240-263 (middle and high school math today), 7.4.1, 7.4.2, 7.5.1
- May 29 China and India: Mathematics in the Islamic World  
Turn in your selection of mathematician for May 30 report  
Show time line to date  
The Latin Middle Ages  
Katz, 288-331 reading  
Exercises: do one from each exercise section of 192-287 that reflects work that you have done in your own life to date.
- May 30 Oral Presentations on YM's work  
Information given for final report
- May 31 The Renaissance, and the Scientific Revolution  
Katz, 342-348, 353-364, 369-378, 385-416, 422 and 544-557, 565-574, 582-590.  
Exercises from each section
- June 4 Subject of final report turned in  
17<sup>th</sup> century mathematics, Newton and Leibniz  
Katz selections from 474-534  
Exercises at end.
- June 5 Transit of Venus: Look this up on the web  
Analytic Geometry  
Katz, 431-503 selections

234#31

- June 6 Euler and other 18<sup>th</sup> century mathematics  
Katz, selections from 544-648
- June 7 19<sup>th</sup> century mathematics  
Katz, 650-703.
- June 8 Oral presentations  
Final report handed in. These can be mailed to me after your presentation.  
Completed time line to look at in class and take home.

### Written Assignments and Presentations

- a. In your journal make a two-page outline of the most important points in your reading.
- b. At the beginning of class hand in a carefully written solution of any exercises (minimum of two from each set in the readings in Katz. You pick the exercises and pick the hardest ones you think you can do, but make sure they interest you and, if possible, inform your school curriculum. Work the exercises with other students face-to-face if possible. Write them up individually. The solutions will be shared with all students so you should have a good set of worked exercises at the end of the course.
- c. Each student will make a six-minute presentation on a pre-determined subject on May 30. Details will be given later. We will make sure these dates work for everyone.
- d. Each student will make a 10 minute presentation on June 7. This presentation will be accompanied by a report of  $n$  pages due on June 8. Details will be given later.

### Grading Method:

Weekly assignments \_\_ 55%, first presentation \_\_ 10%, second presentation \_\_ 15%, final written report \_\_ 20%. This is not fixed in stone.

Fwd: assignments for the rest of the course  
 From: <liz.giancola@gmail.com>  
 To: <ffasanel@aaas.org>  
 Date: Wednesday - June 6, 2012 4:48 PM

Sent from my iPhone

Begin forwarded message:

**From:** "Florence Fasanelli" <ffasanel@aaas.org>  
**Date:** May 27, 2012 9:35:39 PM EDT  
**To:** <jasper.deantonio@gmail.com>, <liz.giancola@gmail.com>, <m.linares927@gmail.com>, <ryan.cooley1@gmail.com>, <ql365@nyu.edu>, <zhy200@nyu.edu>  
**Subject:** assignments for the rest of the course

- May 24                    Rare books at Butler Library, Columbia University  
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                               <http://www.youtube.com/playlist?list=PLF7BD2B59299FAB84>  
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## History of Mathematics for Middle-Grade Instruction

### Final Report

You are to write a paper on a topic of your choice. This is meant to be an interesting, enjoyable and **professionally useful** assignment. So choose a topic with care. The topic should assist you in your middle-school teaching. The only restriction is that it be on a different topic than YM dealt with.

The exercises at the ends of the chapters in Katz suggest many possible topics. Some Fellows will prefer to write about a mathematician, others prefer the history of some mathematical topic. You are encouraged to talk to me (on the phone or via email) about possible topics. As soon as you have an idea, please let me know so that I can suggest possible references or make comments about the reasonableness of your choice of topic. By \_\_\_\_\_ the subject for your final report should be turned in. Each paper must meet the following requirements:

1. The papers are to be on the history of mathematics. They can be neither all history nor all mathematics. Each should contain a reasonably non-trivial piece of mathematics as well as the history and background of that mathematics.
2. Enough expository material should be included so as to make the paper self-contained. If you have doubts, ask a friend to read it. Having someone else read your paper critically is the best way to improve the exposition.
3. You should use a variety of research materials and must give careful references to your sources. You will want to use books and encyclopedias, but I especially encourage you to use <sup>your notes from your papers or other assignments</sup> the journals (a necessity for a grade of B). Your paper should include a bibliography listing your sources and they should be cited in the body of your paper when appropriate. The best sources to use are original sources, but, admittedly, that is hard to do. Their use is, however, required for A work.
4. The paper must be <sup>copy</sup> prepared using a word processor. Issues such as the length, format, etc., are up to you. Since you will be ~~graded~~ <sup>graded</sup> by this last comment, let me point out that papers have a natural length. You are telling a story which needs certain background, exposition, and detail. When that is successfully done, stop; you have finished. ~~You should turn in two copies of your paper as I intend to keep one copy.~~

The **grading of your paper** will be based on a number of factors, including: the historical and mathematical content; the significance, interest, accuracy, and completeness of the material; the accuracy, scope and significance of your references, and the sensitivity with which they are used and cited; and finally, the style in which it is written (poorly written papers <sup>with grammatical errors</sup> will not be accepted). As in Olympic figure skating, your score will be a combination of technical performance and artistic merit. The grade of A will be given only for truly excellent work which uses original sources; B for good solid work that makes use of high quality journal articles; C for average work; D and F for unsatisfactory work.