



MATH 181, Summer 2018

History of Mathematics

http://tamanoi.math.ucsc.edu/tamanoi/Math181_Summer_2018.html



Instructor

Professor Hirotaka Tamanoi

Office: McHenry 4180
Hours: Tuesday 1:30PM – 3:30PM,
Thursday: 1:30PM – 3:30PM, or by appointment
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Lecture

Room: Nat Sci Annex 102

Tuesday Thursday: 9AM-12:30AM

TA

Textbook

The History of Mathematics, An Introduction, 7th edition

By David Burton, Publisher: McGraw Hill

Course Description

We will discuss various mathematical topics of interest throughout the history, from Egyptian and Babylonian mathematics, to Greek mathematics, to modern mathematics. You will work on various problems related to the lecture materials. You will work on a project paper described below written in LaTeX.

Homework, Projects, and Course Grade

Homework Assignments: They will be due on Friday every week at 5PM. You can turn in your homework in the following ways.

- (1) You may turn it in before or after the Thursday class in the classroom. Or,
- (2) You may leave your HW in the Math 181 HW folder in the filing cabinet located on the first floor of McHenry across the classroom 1240. Assignments will be collected shortly after 5pm.

No late homework will be accepted.

Course grade will be determined by the following (tentative) scale:

Homework ~60%, Project~40%

This grade distribution is tentative. It will be adjusted at the end of the quarter according to difficulty of exams.

Exam Schedule

Instead of a Final Exam, there will be a project.

LaTeX information

Downloading of LaTeX for PC and Mac:

For PC: Download ProTeXt. Web site: <http://www.tug.org/protext/>

For Mac: Download MacTeX. Website: <http://tug.org/mactex/>

Instruction on installing LaTeX: Use this [instruction](#) or this [web page](#) to install LaTeX on your PC or Mac.

Learning how to use LaTeX: Here are sample LaTeX source files and resulting PDF files. Change source codes here and there in latex files using LaTeX editor which comes with your LaTeX installation, and experiment. (The first file is a modified version of a file from Math 100 Fall 2012.)

Source file 1: [Texercise.tex](#) PDF file 1: [Texercise.pdf](#)

Source file 2: [SampleFile.tex](#) PDF file 2: [SampleFile.pdf](#)

More Information and Manuals: For a lot of information, see [LaTeX from Wikipedia](#)

For those new to LaTeX, here are some popular manuals for latex

Project Paper

You can choose a mathematical topic of your interest, and explore its historical development and the actual mathematical content, on which you can go as deep as you wish.

The paper should be typed (using LaTeX or comparable program), and about 5 to 10 pages long. Your paper should have the following components.

- (1) Historical development of the topic. You can include short biography of mathematicians involved, and the world they lived in.
- (2) Mathematical exposition of the topic, in chronological order if you prefer. Some topics contain a lot of materials and have many deep results. You can do extensive research and try to give coherent exposition of materials by wisely deciding what not to include. You should include proofs as much as you can handle.

Topics

Here is a list of possible topics. You can choose any topic on your own. [Examples of topics](#)

Project Plan/Summary (Due Thursday 8/15 in class)

Please prepare one page statement of your project plan and summary. Include the following components. Please use LaTeX or a comparable program to type your summary. If your project plan does not seem appropriate, I will let you know individually and ask you to reconsider the topic and resubmit your project summary. (Project summary is not part of your course grade.)

- (1) Brief biography of ancient mathematician(s) whose work you will describe.
- (2) Statement of several theorems you will include in your project. You do not have to include any proof in this project summary.
- (3) If you are not decided on your topic, you can list several different topics.

If you decide to work on a topic for your project different from the project summary after you submit this summary, then you are asked to resubmit a new project summary.

Lecture Schedule (Tentative)

Lecture 1: Egyptian and Babylonian Mathematics, Greek Mathematics

Lecture 2: Chapter 3 Classical Problems

Lecture 3: Chapter 4: Euclid, Archimedes

Lecture 4: Chapter 6, 7. Fibonacci, Cardano, Tartaglia.

Lecture 5: Chapter 8, Heliocentric and geocentric systems, Ptolemy, Kepler, Newton.

Lecture 6: Conic sections and planetary motion

Lecture 7: 3-body problem

Lecture 8: Euler's solution to Basel problem, Euler's number theory

Lecture 9: Fermat's Little Theorem, Euler's phi function

Lecture 10: Cycloid, Brachistochrone, tautochrone

Assignments (Tentative)

Assignment schedule:

Where to turn in: You can turn in your assignment every Friday in two ways.

- (1) You may turn it in before or right after Thursday class, in the classroom.
- (2) You may leave your HW in the Math 181 HW folder in the filing cabinet located on the first floor of McHenry across the classroom 1240 before Friday 5pm. Assignments will be collected shortly after 5pm.

No late homework will be accepted.

Assignment 1(Due 8/3): Section 1.2: 1, 2, 11, 12. Section 1.3: 1, 2, 10, 11. Section 2.3: 1, 2, 6, 7, 16, 17. Section 2.4: 9, 10. Section 2.6: 7, 8.

Assignment 2(Due 8/10): Section 3.2: 1, 11, 12, 13. Section 3.3: 1, 3, 6, 15, 19, 21, 23. Section 3.4: 1, 3, 5, 7. Section 3.5: 2, 5, 7.

Assignment 3(Due 8/10): Section 4.2: 11. Section 4.4: 1, 3, 5, 6, 7. Section 4.5: 2, 4, 5, 6, 9.

Assignment 4(Due 8/17): Section 6.2: 8, 9. Section 6.3: 2, 5, 7(There is a typo in part (c). Read $8|F_n$, instead of $4|F_n$), 8. Section 7.3: 1a, 1b, 3, 4, 14. Section 7.4: 1, 4.

Assignment 5(Due 8/17): Section 8.1: 11. Section 8.3: 1, 2. Section 8.4: 3, 7, 8, 10.

Assignment 6: [Assignment 6 in PDF](#)

Assignment 7: No homework due. Please start on your final project.

Assignment 8: Section 10.2: 1, 3, 4, 6, 7, 11.

Assignment 9:

Assignment 10

