Mathematics 3820H – Mathematics from medieval to modern times
Trent University, Winter 2019

Project

Proposal due on Friday, 1 February.
Project due on Friday, 12 April.

Format. Essays are probably the most straightforward format available to you for the project, but non-essay formats may be used if you wish to try one that is appropriate to your topic. Just be warned that non-essay formats are generally harder to carry off well than essays, and should be cleared with the instructor before putting a lot of effort into pursuing them. You are also permitted to do group projects, with the caveat that more is expected from a group project than an individual project.

The minimum length for an individual essay project ought to be about 2000 words (approximately eight typed double-spaced pages), and decent grammar, spelling, and style are expected. Your instructor is not fussy about formatting and bookkeeping, such as how you handle footnotes and/or endnotes, so long as the result is consistent, complete, and readable.

Proposal. The proposal should describe the format of your project, give the title and the thesis or objective, a very general outline, and a preliminary list of sources that you intend to use. Note that it does *not* commit you to following through on any or all of this for your project, though once your proposal has been returned, you should probably run any major deviations from what you proposed by the instructor for a sanity check.

Topics. Possible topics mostly fall into two categories, mathematical and historical, for which there are somewhat different expectations, noted below. Either way, you should stick to topics which have a significant connection to the history of mathematics after about 450 A.D., with the major exception being mathematics in India before this date. If you have an idea for a topic that doesn't really fall into either category, please talk it over with me before starting serious work on it.

Mathematical. A project on a mathematical topic in MATH 3820H would most likely boil down to choosing some piece of mathematics done at some point after 450 A.D. or so and presenting it. For example, one might pick a problem and look at how people tried to solve it and what that led to. This would mean writing an exposition on the topic in question, with some historical background for context. In many cases, this would also involve a comparison and contrast with modern methods.

Historical. Projects on a historical topic could take a number of different tacks. The most straightforward would probably be a narrative of the activities and influence of some mathematician or group of mathematicians – which would necessarily involve describing some of their mathematics! – making due allowance for gaps and inconsistencies in the historical record and the difficulties of inferring whether some event or person affected another. For this sort of project, you could also compile a reasonable set of possible individuals or groups to work on by consulting the text and/or the books mentioned above. A variation on this theme which would comes close to the mathematical sort of project would be to describe how some body of results or techniques evolved.

Other. A more ambitious sort of project would be one which tried to look at how the development of mathematics influenced other things, such as the development of philosophy,

or was itself affected by them. One cute variation on this would be to write an alternate history working out the effects of a change in some part of the history of mathematics. (If you give this a go, do try to keep the change as plausible as you can!) Another possibility is to do a project on a topic related to the history of mathematics, but not quite of it. For example, one could look at the history of mathematics education or the uses of the history of mathematics in teaching mathematics.

Help. Finally, your instructor would be happy to discuss your project, and look at and criticize outlines, fragments, and drafts of your proposal and/or project, provided you allow some time to read and think about them.

Some possible places to start. (This is *not* an exhaustive list!)

Online

General resources

> *Your favourite search engine!*
> *Google Books*   `https://books.google.ca`
> *Google Scholar*   `https://scholar.google.ca`
> *Open Library*   `http://openlibrary.org`
> *Project Gutenberg*   `http://www.gutenberg.org`
> *The Universal Digital Library*   `http://www.ulib.org`
> *Wikipedia*   `http://www.wikipedia.org/`

Specialized resources

> *Mathematics – History and Overview* at the `arXiv.org` preprint archive:
> `https://arxiv.org/archive/math.HO`

> *History/Biography* at *The Math Forum*:
> `http://mathforum.org/library/topics/history/`

> *History of Mathematics* at *Math Archives* (University of Tennessee - Knoxville):
> `http://archives.math.utk.edu/topics/history.html`

> *History of Mathematics* at *Mathematics Resources on the Internet*:
> `http://mathres.kevius.com/history.html`
> Maintained by Bruno Kevius.

> *The History of Mathematics*:
> `http://www.maths.tcd.ie/pub/HistMath/`
> Maintained by David R. Wilkins.

> *MacTutor history of mathematics archives*:
> `http://www-history.mcs.st-andrews.ac.uk/`

> *The Euler Archive*:
> `http://eulerarchive.maa.org/`

> *Gauss' Works*:
> `http://gdz.sub.uni-goettingen.de/` ... and use their site search.

The Newton Project:
> http://www.newtonproject.ox.ac.uk/

The Newton Project – Canada:
> http://www.isaacnewton.ca/

Wilbour Hall:
> http://www.wilbourhall.org/index.html

This is an amazing compilation of links to original works in mathematics and astronomy, many translated into English. Especially good for ancient mathematics. Maintained by J. Leichter.

Some books

The Heritage of Thales, by W.S. Anglin & J. Lambeck,
Springer Verlag, New York, 1995, ISBN 0-387-94544-X.

The History of the Calculus and Its Conceptual Development, by Carl B. Boyer,
Dover Publications, New York, 1959, ISBN 0-486-60509-4.
Originally published by Hafner Publishing Co. Inc., 1949, as *The Concepts of the Calculus, A Critical and Historical Discussion of the Derivative and the Integral*.

A History of Mathematics (2nd Edition), by Carl B. Boyer & Uta C. Merzbach,
John Wiley & Sons, Inc., 1991, ISBN 0-471-54397-7
(The 3rd edition is due out in November, 2010.)

A History of Mathematical Notations, by Florian Cajori,
Dover Publications, New York, 1993, ISBN 0-486-67766-4.
Originally published in two volumes by Open Court Publishing, Chicago, in 1928 and 1929.
Volume I is available online at the Internet Archive:
> http://www.archive.org/details/historyofmathema031756mbp

Classics of Mathematics, edited by Ronald Calinger,
Prentice-Hall, New Jersey, 1995, ISBN 0-02-318342-X.

A Contextual History of Mathematics, by Ronald Calinger,
Prentice-Hall, Upper Saddle River, New Jersey, 1999, ISBN 0-02-318285-7.

An Introduction to the History of Mathematics (3rd edition), by Howard Eves,
Holt, Rinehart and Winston, New York, 1969.

Mathematical Thought from Ancient to Modern Times, by Morris Kline,
Oxford University Press, New York, 1972.

Mathematics in Western Culture, by Morris Kline,
Oxford University Press, New York, 1953.

History of Mathematics, in two volumes, by David E. Smith,
Dover Publications, New York, 1958, Vol. I: ISBN 0-486-20429-4, Vol. II: ISBN 0-486-20430-8.
Originally published in 1923 (Vol. I) and 1925 (Vol. II) by Ginn and Company (?).

A Concise History of Mathematics (4th Edition), by Dirk J. Struik,
Dover Publications, New York, 1987, ISBN 0-486-60255-9.

A History of Mathematics, by Jeff Suzuki,
Prentice-Hall, New Jersey, 2002, ISBN-10: 0130190748, ISBN-13: 978-0130190741.

A journal

Historia Mathematica, a journal on the history of mathematics, published by Elsevier.
Available at Bata Library, in print and/or electronic form, depending on the issue.
Indexed at `http://www.elsevier.com/locate/hm`

There are many more (re)sources online, in the library, and elsewhere. Ask your instructor
if you need some ideas about where to look.