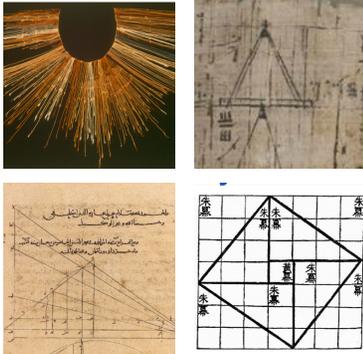
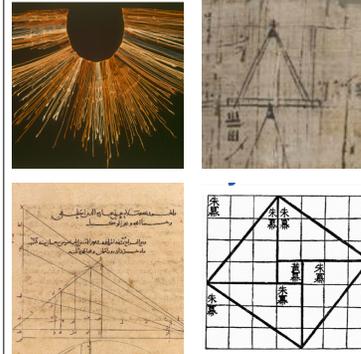


This week



- A bit about this marvelous course (and boring adminstrivia)
- What do we mean by mathematics in this course?
- Sources: How do we know what we know in math history.
 - Early math source: The Ishango bone. Interpretations.
 - Primary and secondary sources.
 - Reliability of sources
- (Maybe) The beginning of counting.

These slides



- Sources: How do we know what we know in math history.
- Early math source: The Ishango bone. Interpretations.
 - Primary and secondary sources.
 - Reliability of sources



- 1 Go to wooclap.com
- 2 Enter the event code in the top banner

Event code
AMYNIH

Write down something you would like to know about the course. (Or just write that you have nothing to ask).

Discussion on the sources to use in this course.

Primary sources



Ishango Bone

A **primary source** is an original, firsthand, or direct piece of evidence or material that provides information about a particular topic or event.

- Primary sources they are **during the time period** which is being studied (correspondence, diaries, newspapers, government documents, art)
- They can also be **produced later** by eyewitnesses or participants (memoirs, oral histories).
- We are often going to work with **transcriptions and translation** of primary sources.

<https://research.library.gsu.edu/HIST2110Primary>

Primary sources



Ishango Bone

A **primary source** is an original, firsthand, or direct piece of evidence or material that provides information about a particular topic or event.

Examples:

- the Rhind Papyrus,
- Plimpton 322 (a Mesopotamian mathematical tablet),
- the Nine Chapters of the Mathematical Art and
- the works of Euler.

Primary sources include

- traditional print and manuscript texts
- non-written works
- social media posts
- Recorded interviews

<https://research.library.gsu.edu/HIST2110Primary>

Give a concrete example of a mathematical primary source (with words, not just links). State a topic that can be studied using this document and explain how to access the text, including a translation if the original is not in English.

You may use Google, Google Scholar, the Stony Brook library website, AI tools, or other resources, but ensure that your example is real and appropriate.

Example The **Ishango bone** is currently housed at the Royal Belgian Institute of Natural Sciences (Institut Royal des Sciences Naturelles de Belgique) in Brussels, Belgium. <https://www.naturalsciences.be/en/museum/exhibitions-activities/exhibitions/250-years-of-natural-sciences/the-ishango-bone>

Examples of primary sources



Section of the Rhind Papyrus -British Museum

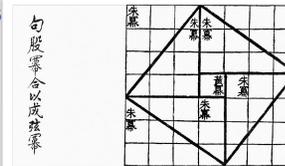
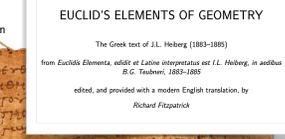
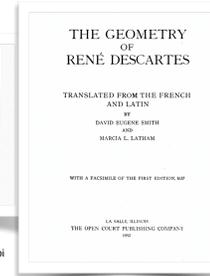


Diagram added by Zhao Shuang (3rd century BCE) to the Zhoubi Suanjing that can be used to prove the Pythagorean Theorem



Fragment of what is likely part of a larger papyrus roll from the early years of the current era. Found in Oxyrhynchus (about 110 miles up the Nile from Cairo and 10 miles west of it. Oxyrhynchus at that time was populated by Greek colonists, a remnant of the conquest in about 330 B. C. by Alexander the Great. The fragment contains the statement, in Greek, of Proposition 5 from Book II of Euclid's Elements
Image Credit: <https://personal.math.ubc.ca/~cass/euclid/papyrus/>



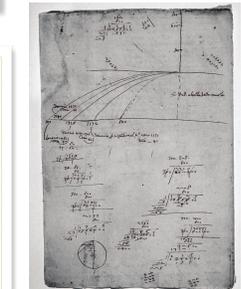
Translation of Descartes' "La Géométrie"



Postcard from Emmy Noether to E. Fischer
Postmarked 10 April 1915. - Public Domain



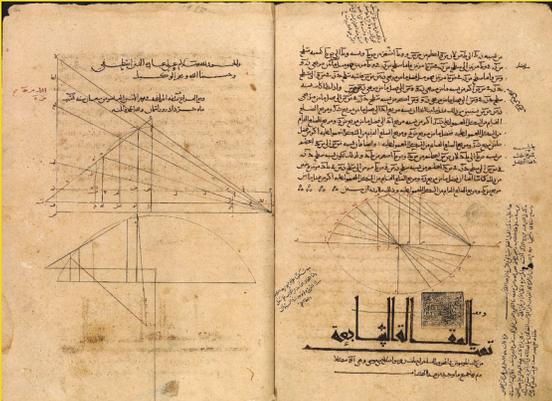
Quipu
By Claus Ableiter nur hochgeladen aus enWiki - enWiki, hochgeladen von User Lyndisauell, siehe http://en.wikipedia.org/wiki/Image:Inca_Quipu.jpg, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=2986738>



A page from Galileo's notebooks, showing an experiment such as the one described here. See Stillman Drake, Galileo's Notes on Motion, monograph 5, Annali dell'Istituto e Museo di Storia della Scienza (Florence, 1979), p. 79.

Book V on Conic Sections was written in the 3rd century BCE, likely between 200 and 190 BCE. Its author, Apollonius of Perga, worked in Perga (now Turkey) and later in Alexandria, Egypt.

Is the 9th-century Arabic translation of the Book V a primary source for any topic? If so, for what topic? If not, why not?



Pages from the 9th century Arabic translation of the Conics

Note: A document can be a primary source for a certain topic and not for other.

Secondary sources

Secondary sources are works that study a topic through studying, researching, **analyzing and interpreting primary sources**.

Secondary sources

Secondary sources are works that study a topic through studying, researching, **analyzing and interpreting primary sources**.

Secondary sources include books and articles written from a historical perspective (later in time), reviews, textbooks, biographies, and indexes.

Secondary sources

Secondary sources are works that study a topic through studying, researching, **analyzing and interpreting primary sources.**

In the bibliographies of your paper and presentation, you can **only use relevant secondary sources which are from peer reviewed journals written in English** (One way to find them is through the SB library or JSTOR- linked in the course website).

If you are in doubt of your source, consult with me.

Every item in your bibliography should be referenced.

Every fact in your paper that is not common knowledge, **should have a reference** to an item in your bibliography.

Examples of secondary sources



BLACK AFRICAN TRADITIONAL MATHEMATICS

Author(s): Claudia Zaslavsky

Source: *The Mathematics Teacher*, APRIL 1970, Vol. 63, No. 4 (APRIL 1970), pp. 345-356

Published by: National Council of Teachers of Mathematics

Stable URL: <https://www.jstor.org/stable/27958390>

Did Euclid's Elements, Book I, Develop Geometry Axiomatically?

Author(s): A. Seidenberg

Source: *Archive for History of Exact Sciences*, 30.XII.1975, Vol. 14, No. 4 (30.XII.1975), pp. 263-295

Published by: Springer

Stable URL: <http://www.jstor.com/stable/41133436>

Jiu Zhang Suanshu 九章算術 (Nine Chapters on the Mathematical Art): An Overview

Author(s): Lam Lay Yong

Source: *Archive for History of Exact Sciences*, June 1994, Vol. 47, No. 1 (June 1994), pp. 1-51

Published by: Springer

Stable URL: <https://www.jstor.org/stable/41133972>

Problems 1 to 6 of the Rhind Mathematical Papyrus

Author(s): R. T. Gillings

Source: *The Mathematics Teacher*, JANUARY 1962, Vol. 55, No. 1 (JANUARY 1962), pp. 61-69

Published by: National Council of Teachers of Mathematics

Stable URL: <http://www.jstor.com/stable/27956523>

TheWorld's First Mathematics Textbook

HERBERT GOLDSTON

Editor

In the book, we see, as far as we can, the best and the most interesting work that has been done in the field of mathematics. It is a book that is not only a source of information, but also a source of inspiration. It is a book that is not only a source of information, but also a source of inspiration. It is a book that is not only a source of information, but also a source of inspiration.

The problems are, in general, presented in a way that is not only a source of information, but also a source of inspiration. It is a book that is not only a source of information, but also a source of inspiration. It is a book that is not only a source of information, but also a source of inspiration.

The Stony Brook Library

https://search.library.stonybrook.edu/discovery/search?query=any,contains,lshango%20bone&tab=Everything&search_scope=EverythingNZBooks&vid=01SUNY_STB:01SUNY_STB&offset=0

Search: lshango bone



Google scholar

Search results for 'lshango bone' on Google Scholar. The top result is 'Does the lshango bone indicate knowledge of the base 12? An interpretation of a prehistoric discovery, the first mathematical tool of humankind' by V. Balas, arXiv preprint arXiv:1204.1016, 2012. Other results include 'The ISHANGO BONE. The World's First Known Mathematical Sieve and Table of the Small Prime Numbers' by C. Karamata, 2021.

https://scholar.google.com/scholar?hl=en&as_sdt=0%2C33&q=lshango+bone&btnG=

Give a concrete example of a mathematical, peer reviewed, secondary source. State a topic that can be studied using this secondary source.

Feel free to use Google Scholar, the Stony Brook library website, , AI (artificial intelligence)... but check it.

Hint: Use [jstor.org](https://www.jstor.org) or the SB library (<https://library.stonybrook.edu/>) or Google Scholar or AI

Can this website be considered as secondary source?
Is it reliable? Can you use it for your work in this course? Why or why not?



<https://www.storyofmathematics.com/>

A reliable website?

According to some authorities, there is evidence of basic arithmetic and geometric notations on the petroglyphs at Knowth and Newgrange burial mounds in Ireland (dating from about 3500 BCE and 3200 BCE respectively). These utilize a repeated zig-zag glyph for counting, a system that continued to be used in **Britain and Ireland** into the 1st millennium BCE.



Stonehenge, a Neolithic ceremonial and astronomical monument in England, which dates from around 2300 BCE, also arguably exhibits examples of the use of 60 and 360 in the circle measurements, a practice which presumably developed quite independently of the sexagesimal counting system of the ancient **Sumerian and Babylonians**.

<https://www.storyofmathematics.com/prehistoric.html>

A reliable website?

the left column represented larger values, much as in the modern decimal system, although of course using base 60 not base 10. Thus, $\Upsilon \Upsilon \Upsilon$ in the Babylonian system represented 3,600 plus 60 plus 1, or 3,661. Also, to represent the numbers 1 – 59 within each place value, two distinct symbols were used, a unit symbol (Υ) and a ten symbol (C) which were combined in a similar way to the familiar system of **Roman** numerals (e.g. 23 would be shown as $\text{C}\Upsilon\Upsilon$). Thus, $\text{C}\Upsilon\Upsilon\Upsilon$ represents 60 plus 23, or 83. However, the number 60 was represented by the same symbol as the number 1 and, because they lacked an equivalent of the decimal point, the actual place value of a symbol often had to be inferred from the context.

8	18	28	38	48	58
9	19	29	39	49	59
10	20	30	40	50	

Babylonian Numerals

It has been conjectured that **Babylonian advances in mathematics** were probably facilitated by the fact that 60 has many divisors (1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 and 60 – in fact, 60 is the smallest integer divisible by all integers from 1 to 6), and the continued modern-day usage of 60 seconds in a minute, minutes in an hour, and 360 (60×6) degrees in a circle, are all testaments to the ancient Babylonian system. It is for similar reasons that 12 (which has factors of 1, 2, 3, 4 and 6) has been such a popular multiple historically (e.g. 12 months, 12 inches, 12 pence, 2 x 12 hours, etc).

The Babylonians also developed another **revolutionary mathematical concept**, something else that the **Egyptians, Greeks** and **Romans** did not have, a circle character for zero, although its symbol was really still more of a placeholder than a number in its own right.

<https://www.storyofmathematics.com/sumerian.html>

A reliable website?

Introduction

- Mayan & other Mesoamerican cultures used the vigesimal number system. Vigesimal system based on base 20 and to some extent base 5.
- Theory suggest that it was develop from using the fingers and toes.
- Dates back to the 4th cent. Approximately 1,000 years more advance than the Europeans.

Diagram A

Mayan number system consist of three symbol. A shell that represent zero, a dot represent one, and a line represent five. One could write up to 19 with the these symbol. Mayans were one of the only civilization that understood the concept of zero from 36 BCE.

Diagram B

Mayan numeral system

- $20^3 = 5 \cdot 8,000 = 40,000$
- $20^2 = 0 \cdot 400 = 0$
- $20^1 = 12 \cdot 20 = 240$

- Mayans number system was used by merchants and in speeches.
- Places values are arrange vertically.
- Numbers can be found on stelae and monuments.
- Mayan may have used a "Abacus"

Mayan Calendar used base 18.

<https://www.slideshare.net/EdicePachikerl/mayan-numeric->

A reliable source?

<https://www.britannica.com/science/mathematics/Mathematics-in-ancient-Egypt>



The screenshot shows the top portion of a Britannica article. At the top is a dark navigation bar with the Britannica logo and a search icon. Below this is a red button labeled 'Ask the Chatbot' and a menu with options for 'Games & Quizzes', 'History & Society', and 'Science & Tech'. The article title 'Mathematics in ancient Egypt' is displayed in a large, bold font, with a breadcrumb trail 'Science > Mathematics' above it. Below the title are two buttons: 'Ask the Chatbot a Question' and 'More Actions'. At the bottom of the screenshot, there is a small text block providing metadata: 'Also known as: math', 'Written by Craig G. Fraser, Jeremy John Gray • All', 'Fact-checked by The Editors of Encyclopaedia Britannica', and 'Last Updated: Aug 12, 2025 • Article History'.

“The same way you can feed your body junk food, we are feeding our mind junk information. We need an information diet. People should think carefully about the amounts and the quality of the information they take in.”

Yuval Noah Harari

Can these slides
be considered a
secondary source?
Why or why not?

https://math.hawaii.edu/~mchyba/documents/syllabus/Math499/Babylonians/MI314_02_Egypt_Babylon.pdf