

1. The paper must be at least 5 pages long (double-spaced, 12 point font), and must include some mention of mathematics (see 4 and 5 below). You must use at least one source outside of the textbook. This may either be a book or article from the library or library database, or an Internet site. You must include a complete list of all your sources at the end of the paper.
2. The paper will be graded on the following criteria: correctness of English usage including grammar and punctuation; logic and coherence of presentation; correctness, breadth, and depth of mathematical content.
3. While parts of the paper may be paraphrased or summarized from your sources, it is the instructor's expectation that the paper be written largely in your own words. Copying from another source word for word without using quotation marks and a proper citation is plagiarism. Also, if you follow the words of a source too closely, and do not use quotation marks, it can be considered plagiarism even if you cite the source. If the instructor can document that either of these types of plagiarism has occurred, or that that you have not cited all your sources at the end of the paper, your grade for the paper will be lowered, possibly all the way to F depending on the severity and extent of the offense.
4. Suggestion: write a biography of a mathematician. Include a description of his or her mathematical contributions. The description may be brief (such as, Archimedes estimated the value of π to be between $3\frac{10}{71}$ and $3\frac{1}{7}$), or it may include more details (such as a description of how Archimedes found his estimation—by inscribing and circumscribing polygons in circles, etc.). Alternatively, you may omit biographical information and write only about the mathematical contributions of the individual—either a summary of many of his contributions, or an in depth explanation of one or two of them. For your convenience, here is a list of some mathematicians of importance. These are only suggestions—you may write about someone else if you choose.
 - Thales of Miletus—Greek, can include “legends”
 - Pythagoras and the Pythagoreans—Greek, can include legends
 - Tsu Chung-Chi—Chinese mathematician and astronomer
 - Hippocrates of Chios—Greek, squaring the circle, lunes
 - Eudoxus of Cnidos—Greek, theory of incommensurables, planetary models
 - Euclid—Greek, geometry, number theory, geometric algebra
 - Appolonius of Perga —Greek, conic sections, planetary models
 - Eratosthenes of Cyrene—Greek, geography, finding primes, doubling the cube, calculated the circumference of the earth
 - Archimedes of Syracuse—Greek, one of the greats
 - Hypatia—Greek, 1st known female mathematician, killed by religious zealots
 - Claudius Ptolemy—Greek, earth-centered planetary theory, trigonometry, geography
 - Diophantus of Alexandria—Greek, integer equations in two unknowns (“Diophantine” equations), other algebraic equations
 - Pappus of Alexandria—Greek, commentator on earlier Greek mathematics
 - Liu Hui—Chinese, commentary on the *Nine Chapters of the Mathematical Arts*
 - Tsu Chung-Chi—Chinese mathematician and astronomer
 - Chang Ch'iu-chien—Chinese, author of *Mathematical Classic*
 - Aryabhata—Indian, astronomy, trigonometry, Diophantine equations

- Brahmagupta—Indian, Diophantine equations
- Bhaskara—Indian, Diophantine equations, author of the *Siddhanta Siromani*
- Muhammed Ibn Musa al-Khowarizmi—Islamic, algebra
- Abu Kamil—Islamic, algebra
- Omar Khayyam—Islamic, poet and mathematician
- Leonardo of Pisa (also known as “Fibonacci”)—Fibonacci numbers, Hindu-Arabic decimal system, Diophantine equations
- Nicolo Tartaglia—cubic polynomial equations
- Girolamo Cardano (better known as “Cardan”)—cubic polynomial equations
- Rafael Bombelli—imaginary numbers
- Ludovico Ferrari—4th degree polynomial equations
- Regiomontanus (also known as Johannes Muller)—trigonometry
- Nicolaus Copernicus—sun-centered planetary theory
- Galileo Galilei—mathematics of motion
- John Napier—logarithms
- Johann Kepler—Kepler’s Laws of planetary motion, calculus forerunner
- Rene Descartes—analytic geometry, calculus forerunner, also a great philosopher
- John Wallis—calculus forerunner
- Isaac Barrow—calculus forerunner
- Pierre Fermat—number theory, probability, calculus forerunner
- Blaise Pascal—probability, calculus forerunner, young genius but gave up math and turned to philosophy/religion
- Isaac Newton—discovered calculus, established modern physics, one of the greats
- Gottfried Leibniz—discovered calculus, also a great philosopher
- Leonhard Euler—most “versatile and prolific” mathematical writer in history, developed much of our modern notation
- Maria Agnesi—woman, “witch” of Agnesi
- Carl Friedrich Gauss—one of the greats
- Evariste Galois—died in duel at age 20, beginning of abstract algebra
- Nicolai Lobachevsky—non Euclidean geometry
- Wolfgang Bolyai—non Euclidean geometry
- Ramanujam—poor and uneducated Indian genius, died early
- Alan Turing—father of computer science, committed suicide
- Amalie Emmy Noether—woman, abstract algebra

5. You may also organize your paper by topic, instead of individual. Some possible topics are listed below. These are only suggestions; you may also write on your own topic, so long as it has been approved by the instructor. Whatever you write about, you must include some mention of mathematics, even if it is only a brief description of something mathematical.
- You may organize your topic around any of our textbook’s list of “Projects,” or any of the book’s “Questions” that were not assigned as homework.
 - You may also use as a topic any of the topics of the “Sketches” found in our textbook. However, in this case, your paper must include material not found in the book, and must not simply paraphrase and shorten what the book says.
 - Women in mathematics
 - The mathematics of a specific culture—for example, Chinese mathematics, Egyptian math, Babylonian math, Mayan math, Indian math, Arabic math, African math, etc.

- The mathematics of the Egyptian pyramids
- *The Nine Chapters of the Mathematical Arts*
- The three construction problems of (Greek) antiquity
- Ancient astronomy
- History of the “golden ratio”
- History of the Hindu-Arabic decimal system and its adoption in Europe
- History of the Fibonacci numbers
- History of “Pascal’s” Triangle
- The Copernican Revolution
- The “calculus controversy” (Newton vs. Leibniz)
- How may the history of mathematics be used in the classroom? Describe some specific examples of using history to *teach* mathematics.

6. Here are some Internet sites to check out. You don’t have to use them—you may find your own sites if you want—but you should know about them, because they contain good resources for the study of the history of mathematics.

<http://www.dcs.warwick.ac.uk/bshm/resources.html>

<http://archives.math.utk.edu/topics/history.html>

<http://mathforum.org/library/topics/history>

<http://www.maths.tcd.ie/pub/HistMath/Links>

<http://www-groups.dcs.st-andrews.ac.uk/~history/>