Math 311 M Writing Project

Choose one of the three topics below. Study it and write a short paper, about 4 typed pages. The paper must be typed, preferably in TeX or LaTeX. If you choose to use another typesetting system, make sure that all the formulas look nice.

The paper should include the title, the name of the author, and a list of sources that you used (books, web pages, etc.) You should use at least two sources.

The paper should be written in complete sentences and it should be easy to follow. The writing must be your own. Do not just copy from a source. Combine information from several sources, add explanations and details when needed, and express ideas in your own words.

The proofs should contain all the necessary details. You may use without explanations any concepts and facts from Math 140, 141, 230 (Calculus I, II, III), from Math 220 (Matrices), and from this course (only the topics that we covered so far).
Any other concepts should be defined and/or explained.
Your paper should be completely understandable to other Math 311M students.

E-mail or hand in a preliminary version of the paper by *Friday, November 10.*
The final version is due on **Friday, November 17.**

TOPICS:

Fibonacci Numbers

The definition and a list of the first few.
History.
Statements and proofs of several (at least two) properties of your choice.
Applications of Fibonacci numbers may also be discussed (optional).
This topic is the most flexible of the three as you choose which properties to write about.

Averages and Means

Definitions of the arithmetic mean and of the median for n numbers.
Examples and comparison.
The definition of the geometric mean.
The arithmetic mean is greater than or equal to the geometric mean, with a proof.
An application of this inequality.
Power (or generalized) means and their properties, at least one with a proof.

Pythagorean Triples and Fermat's Last Theorem

Pythagorean triples: definition, examples, and how to generate them.

Fermat's Last Theorem: statement, history, and an elementary proof for the case of $n = 4$.