Project Due Wednesday, March 16

Math 111 - Project 1 Topics

There is no required textbook for Math 111. Instead, we have been reading *Here's Looking at Euclid* by Alex Bellos. For this project, you will take one of the topics mentioned in that book and write a section of your own math textbook based on that topic. Your section should be between 1000 and 1500 words typed. You should include the following:

- You should include a discussion of your topic. Where appropriate, talk about its history, applications, and/or any interesting anecdotes that you want to include. Be careful that your text not simply copy what you find in our book or on Wikipedia.
- You should include **at least** 4 worked examples complete with explanations. For example these could be proofs of the Pythagorean theorem if that was your topic, or pictures showing the steps for how to add, subtract, and multiply on an abacus.
- You should go into **more** depth than is found in *Here's Looking at Euclid*.
- If your examples need pictures, please draw them. It is ok if they are hand drawn.

Your grade will be based on the following factors.

- Accuracy - all facts should be accurately stated.
- Information content - include details, mathematics, and interesting facts. The more information the better!
- Clarity - try to make your article readable. Use complete sentences, and correct grammar. Make sure that the reader has no trouble understanding your examples.
- Sources - You must include at least 3 sources, only one of which may be Wikipedia.

Below is a list of suggested topics. You are welcome to suggest your own topic, but it must be something mentioned in the book *Here's Looking at Euclid* and it must have significant mathematical content. Check with me if you have an idea.

1. **Proofs of the Pythagorean Theorem** - *There are lots of proofs of the Pythagorean theorem. Pick a couple and explain them, and discuss who came up with them.*
2. **How an Abacus Works** - *Give examples showing how an abacus works for addition, subtraction, multiplication, etc.*

3. **Perfect Numbers** - *What are perfect numbers? What do they have to do with prime numbers? What are some interesting theorems about perfect numbers?*

4. **The Golden Ratio** - *What is the golden ratio? What does it have to do with Fibonacci numbers? What are some interesting formulas for the golden ratio?*

5. **Vedic Mathematics** - *Describe some Vedic methods for performing arithmetic such as (but not limited to) the Vertically and Crosswise method.*

6. **Ancient Number Systems** - *Explain how numbers were written in ancient times by different cultures. Choose 3 or 4 different cultures and compare their methods. Good examples are Babylonian, Greek, Roman, Egyptian, Hebrew, Chinese, and Mayan numerals. Give examples, and also discuss their history, and who actually used them.*

7. **Other Bases** - *Discuss other bases such as binary, base-12 (dozenal), and base-16 (hexidecimal). Pay particular attention to the applications of these bases. Give examples of applications and computations using these different bases.*

8. **The Number** π - *What is the precise definition of* π*? What are some formulas for calculating it? Be sure to explain all notation in the formulas.*

9. **Math and Origami** - *This is a very open ended topic, there are lots of things you could discuss. You could talk about some of Haga's theorems, or about what shapes you can construct with origami, or how to find the cube root of a length with origami.*