**Precalculus Explore Your Own Topic Project - *Overview***

GOAL: Students become experts on a math topic by exploring it in more depth, gaining an advanced understanding of the material and providing avenues by which others gain an understanding as well.

You will create an educational piece of literature that conveys a deeper understanding of a chosen topic and can stand alone to be used by others to learn about the topic in multiple ways. This book must include:

* **The “Hook” or “Attention-getter”** (1 pg.) – an intriguing real-world problem designed to interest readers and provide a context for the topic you will teach in your book
  + *This should be a problem that readers can use the information in your book to solve*
  + *All readers should be able to come back to it at the end of the book and be able to solve it*
  + *If a picture or diagram of the situation is appropriate, include it*
  + *This problem should make it clear why the topic you studied is important*
  + *Any extra description or context is appropriate, to get the main idea across*
* **The Objective** (1 pg.) – the mathematical understanding(s) readers should have after reading through your book and working through the “hook” problem
  + *What do you want readers to learn in reading your book?*
  + *What should readers know or understand when they’ve finished it?*
  + *What should readers be able to do when they’ve finished it?*
* **The Exploratory Problems** (1-2 pgs.) – a **small** set of problems for readers to solve first that provide any necessary *background* for learning about your topic.
  + *These problems should be REVIEW for most readers*
  + *The number of problems you include here is completely up to you.*
  + *These problems should be do-able! You don’t want your reader to think, “I can’t do this! I hate math! I’m giving up!”*
  + *This is NOT a place for you to TELL readers what they should know before learning your topic*
  + *This IS a place for you to give readers a few simple problems for them to review ON THEIR OWN the concepts they need to remember*
  + *These problems should be a warm-up for your reader to begin learning about your topic:*
    - *Ex: if your topic was graphing the transformed sinusoid y=2+sin(x-4), you might want to have readers graph a basic sine function or remind them how to use the unit circle*
  + *You MUST provide an answer key of some kind for all the problem you include here*
* **The Lesson** (? pgs.) – a set of properties, examples, problems and/or diagrams that help students meet the objective of your book
  + *This is the most important part of your book and should relay the main concept you are focused on teaching to the reader in AT LEAST TWO DIFFERENT WAYS*
    - *Ex: give two different example problems or real-world models*
    - *Ex: use one graphical example and another algebraic example*
    - *Ex: to learn how to find an intersection, students could graph and estimate OR could look at a data table*
  + *After this section, readers should have a good conceptual idea of the concept and should be able to solve new problems using it*
  + *There are many ways to design this section, some of which are listed below:*
    - *Students work through a short MathLab to make discoveries on their own*
    - *Students are shown example problems, then are given new ones to practice*
    - *Students are shown an incomplete problem and must fill in the blanks*
    - *Students perform an experiment and use observations to come to a conclusion*
  + *This section should not take the average student more than* ***ten minutes*** *to read or work through, so you need to choose your format and content carefully!*
  + *When finished reading this section, readers should be able to go back to the “hook” problem and solve it.*
  + *THINK ABOUT HOW YOU LEARN MATH BEST WHEN DESIGINING THIS SECTION! If you read your own book, would you get it?*
* **Summary** (1 pg.) – a SHORT section that sums up the big idea of the book, including any necessary properties, formulas or definitions that can be used by readers as a quick resource
  + *This is a good place for a list of important vocabulary, formulas you used that are important to remember or diagrams that could aid readers solving new problems*
  + *Do NOT make this section more than a page!*
* **The “Hook” Problem (again) and Solution** (2 pgs.) – on one page, a re-print of the initial problem, giving only the information and context needed for a reader to solve it; on the next page, your detailed solution to the problem
  + *This is the SAME problem you used on the first page of your book, but it is re-printed for students to solve (kind of like a homework sheet)*
  + *Your solution should be clear and detailed, and should of course be correct!*

\*NOTE: A *Table of Contents*, *Index* or other informational page is optional.\*

**Over-arching questions:**

1. Is it clear from my book that I have a deep understanding of this topic?
2. Could any other 11th grade student use my book to learn about my topic?