MTH 341 Project – Geometry theorems and technology

In this project, you will have to demonstrate your ability to "process" a theorem and/or its proof into a technology-friendly format. Possible topics for you to choose from are listed below. You will provide a narrative and appropriate GeoGebra files.

- Narrative can be a combined document (typed text with hand written formulas and images) that you will submit as a hard copy. Alternatively, if you are able to create it fully in the electronic form, you can e-mail it.
- Accompanying ggb files can be either attached to the same e-mail message. Alternatively, you can upload your files to your GeogebraTube account, make them shareable and include the link(s) in your narrative. If you are submitting a hard copy, also send the link(s) by e-mail.
- If you are submitting an electronic copy of your paper, name the file in the format YourLastName_Project . For example, a student Samantha Smith would send a file named "Smith_Project". In the subject of your message, clearly indicate that it is a Project Submission.
- Feel free to ask any questions you might have about the assignment.

Your narrative should address the following:

1. State the theorem you are about to explore. Explain why you chose that particular topic.
2. Define your audience. Is your activity suited for high school students? College students? High school teachers? Mathematicians? Etc. Explain your choice of audience.
3. Guide the reader so that s/he will understand what the theorem is about and how/why it works. Do *not* provide or re-state a *deductive* proof of your theorem. Lead the reader to discover *inductive* arguments that would convince the reader that the theorem is valid. Ask the reader to construct and/or play with certain dynamic geometry constructions and observe their particular aspects. Make sure you provide enough information for the reader to be able to follow the exploration.
4. Make sure that your exploration includes a discussion of particular situations that the theorem implies. For example, if you chose to explain a theorem about the triangle orthocenter, you would make sure that your readers play with the construction in a way that they will conclude that it holds for all kinds of triangles, not just, say, acute triangles.

Alternative format:

Instead of stating the theorem at the beginning, try to design an activity/exploration, at the end of which the reader would be able to formulate the theorem.

Bottom line: You should demonstrate that you are able to read and understand an unfamiliar, advanced theorem and make it accessible through the use of technology to the audience of your choice.

Suggested topics (triangle, quadrilateral and circle geometry):

- Napoleon Triangle Theorem
- Ceva's Theorem
- Meneleaus' Theorem
- Feuerbach's Theorem
- Morley's Theorem
- Simson lines
- Pascal's Theorem (The one that states *In a hexagon inscribed in a circle, the intersection points of opposite sides are on a straight line).*
- Broken chord theorem
- Brianchon's theorem
- Butterfly theorem
- The Midsegment Quadrilateral Theorem

Other significant, non-trivial topics that you came across might be acceptable. Make sure to provide rationale for your choice. Feel free to talk to me if you are not sure if a theorem you have in mind is "significant" and/or "non-trivial".