Spring 2018	MA 434	Final Project Assignment

Task: With a partner, you will write a short paper and give an approx. 30 minute presentation on an assigned topic. The paper should be aimed at an audience of undergraduates who have taken abstract algebra but who have not taken any further study in algebra.

Purpose: MA 434 is a capstone course for a major in mathematics. All semester you've been learning to read a difficult, but elegant, mathematics text. You've presented material, filled in details, and worked on very difficult homework problems. This project is now an opportunity for you to further explore an aspect of geometric group theory by reading papers and textbooks. You'll apply the skills you've learned to other sources. It is also an opportunity to learn from the research your classmates have done.

The paper: The paper should be 2 – 3 pages in length and typed in LaTeX or directly in WordPress (I can give you a link and permission). If I am happy enough with your article, I will post it (with your permission) to the blog "The Geometric Viewpoint." The paper should focus on big ideas rather than technical details. It should make someone from the intended audience want to learn more and to gain some appreciation for a type of problem or proof technique from geometric group theory.

It will be graded on:

- how engaging it is to read. Will audience keep reading or will they lose interest?
- originality and creativity of expression, while still being clear and professional
- correctness of the mathematics explained
- grammar/spelling/sentence structure
- adherence to the directions above
- thorough citation of sources used and consulted during the project.

The presentation: Unlike the paper, the presentation is aimed at your classmates. While you should do a good job motivating your topic, you will want to spend more time on technical material. Your presentation should not only state an important theorem concerning your topic, you should also give some idea of the ingredients of proof. You will likely not give all the details. Your presentation may use slides, the board, or a combination. Like the previous presentations, you should make good use of examples and pictures.

It will be graded on:

- how engaging it is to listen to
- appropriate balance of big picture and technical details
- originality and creativity of expression, while still being clear and professional
- correctness of the mathematics explained
- professionalism of presentation
- adherence to the directions above
- thorough citation of sources used and consulted during the project.

Warning: Although mathematicians typically do not place quotation marks around direct quotes of mathematical material, we do **always** provide a citation. Failure to cite your sources may result in a report of academic dishonesty.

Introductory or explanatory material should have quotation marks if it is a direct quote, though generally you should paraphrase or, even better, write your own. In any case, if you rely on someone else's work for either the idea or the phrasing, you should provide a citation.

Proofs will likely closely follow proofs in your sources. You should find your own (probably mild) ways of rewording or re-organizing the proof to reach the intended audience. But, as with statements, be sure to include a citation. This is usually done in a sentence prior to beginning a proof.

Guidelines:

- Do not rely on a single source, especially if it is a survey article or chapter from a book. If you do, you will have a very difficult time finding your own presentation of the material.
- Do not expect to understand all, or even most of, the mathematics research papers you look at. Try to glean something from each one: even if it is just the goal of the paper or what, if any, topics from this semester's course show up.
- Use MathSciNet (ams.org/mathscinet) and the arXiv to find other research papers relevant to your topic. Don't be afraid to order articles which Colby doesn't have access to via CBB request or ILL.
- Work on both the presentation and the paper simultaneously since there will not be a lot overlap of content, but the same background work will go into both.
- As you work, keep track of what ideas you get from where so that you can provide a citation for every idea which comes from someone else. MathSciNet makes it easy to compile a bibliography using the clipboard features.
- Come discuss your project with me frequently.
- Try to make your presentation tell a story: what's the beginning, middle, and end? How much of that story can be adapted to your paper?

How to get started:

- Begin by perusing the articles and other resources provided. Figure out what the main goals of the technique or topic are. Figure out what kind of tools are used in proofs: combinatorial? geometric? algebraic? something else?
- Look through the results on MathSciNet and the arXiv – try to find papers you might have a hope of understanding something of. Read the review in MathSciNet or the introduction to the paper– if none of the words make any sense, consider quickly moving onto another source.
- Among the papers/resources you've looked at, which results seem to be most important? Which are tangential? Which are important but very technical? Among the "most important" results, which ones are most interesting to you? Which ones might you be able to explain? Base your paper and presentation on those.