Overview. Choose a discipline within the arts or the humanities and write a 10–20 page paper comparing and contrasting the development of geometry and of that discipline.

Purpose. The three main goals of this project are for you to:

- review the material that we have covered this semester,
- demonstrate an understanding of that material,
- learn something new about the relationship between mathematics and other aspects of culture.

Instructions. Choose a discipline within the arts or the humanities and write a paper comparing and contrasting the development of geometry and of that discipline.

There are several dates that are relevant to this paper:

- **Monday, February 10.** Have a paper topic chosen. Write a paragraph or two about your proposed topic and how you plan to treat it in your paper. The more specific that you can be, the better the suggestions I can give you to help you with your paper.

- **Friday, March 7 and Monday, April 7.** These are informal “paper check-in” dates. No particular part of the paper needs to be finished at these checkpoints, but I will meet with each student individually to see how the paper is progressing. As before, the more of the paper that you have drafted, the better the suggestions I can give you to help you with your paper.

- **Monday, April 21.** You should have a complete rough draft of your paper by this point. I will read your draft and give you a short list of suggestions (about 2–4 of them). If your paper is already fairly polished, then these suggestions will be about how to refine the paper further. If your paper is very rough, then these suggestions will help you refine the paper to some degree but implementing them may or may not be enough to earn you an A on the paper. As with the other due dates, the more that you have prepared, the more useful my suggestions can be.

- **Wednesday, May 7.** Submit the final version of the paper as per the instructions below before the beginning of class time on this date.

The hypothetical intended audience for this paper is an intelligent and culturally literate student who is not an expert in either of the fields that you are writing about. The paper should stand on its own and be understandable even to someone who does not have the course text or the course notes. In it, don’t refer the reader to specific passages in the text or to the course notes. Beyond these considerations, the writing style is up to you.

Assuming that the paper is double-spaced and that its margins and text size are fairly standard, it should be approximately 10 to 20 pages plus pictures, diagrams, and tables (if any). The exact length within that page range is up to you. Longer papers are not
necessarily better, and you should not aim for any particular paper length. Your paper should be long enough to serve its purpose and no longer.

You are welcome to use the royal *we*, the individual *I*, or the passive as you see fit. The royal *we* is common in mathematics papers (even in those with a single author), but any of them is fine. The point is to communicate clearly no matter which of them you use.

As for citations, since much of the material that you are summarizing may come from the textbook, you should cite that book once toward the beginning of your paper as the source for all further uncited mathematical material in the book. For example:

The textbook for this course was *Euclidean and Non-Euclidean Geometries: Development and History* by Greenberg.\(^1\) Since it is the source used for most of the mathematical material in this paper, we will not cite it individually any further in this paper.

The superscript 1 in the above passage is used to denote that item 1 in the bibliography should be an entry for the course textbook. Do not use footnotes for your citations; instead you should have a bibliography at the end, which is standard in mathematics papers.

You will undoubtedly have other sources that you need to cite in your paper, so be sure to do so. You do not need to cite class notes or lectures. The bibliography itself does not need to have any particular format; just be sure that it contains enough information for the interested reader to track down any of your sources easily. If you cite a web page, be sure to include an access date in its bibliographic entry.

Submit your paper to me as an email attachment in pdf format by the beginning of class on Wednesday, May 7. The file name for your paper should be

\[
\text{yourPeoplesoftLogin-project}
\]

where *yourPeoplesoftLogin* is your login name on the campus Peoplesoft system (e.g., jbernhard for me, so my file would be named jbernhard-project. There should be no spaces or capital letters in your file name, and the character in the middle is a hyphen, not an underscore. I will not accept files in any other format (such as Microsoft Word files): your paper must be in pdf format.

**Grading.** The two major aspects of your paper that I will assess to determine your grade are:

- **Content:** Does your paper actually discuss the most important major topics in the development of geometry? Do your explanations show that you really understand the course material? Have you compared and contrasted the development of the two fields, as instructed?

- **Clarity:** Is your paper well-organized and easy to navigate? Are your explanations clear and easy to follow? Have you cited your sources appropriately, and does your paper have a bibliography? Is your grammar generally good, and have you kept the number of typos to a minimum so that they do not detract from the exposition? Did you follow the instructions for writing the paper?

As you are working on the paper, I would encourage you to ask me about it to see if you are on the right track and if I can offer some suggestions on it. There is no exact single set of geometric material that you must discuss, and it’s fine if your selection differs to
some extent from what I might select. But if your paper is lacking in any fundamental geometric developments, that will affect your grade adversely.

Keep in mind the goal that you are to demonstrate an understanding of the material. Such an understanding can be shown by selecting your topics well and by explaining them clearly and in your own words. As a rather extreme example, even with an appropriate citation, simply copying the book in a ridiculously small font and turning that in as your paper would demonstrate no understanding of the material whatsoever and so would result in a failing grade for the paper. On the other hand, a good way to show your understanding of a topic is to first write up your own explanation without consulting the book directly, and only then go back and check the book for correctness on specific points as need be.

Other. As a reminder, you are not allowed to work with anyone else on this paper or to discuss the paper with anyone else. Any questions about it should be directed to me only.

I encourage you to work on this paper throughout the semester. As a practical matter, doing so will make completing the paper much easier at the end of the semester. And with each new topic that we learn, working on the paper will also help you reflect on how the new material fits into the bigger picture and refine your understanding of the earlier material.

If you have any questions about the paper, please ask me any time during the semester!