

Extra Credit Projects (Due Thursday, December 5th)

Choose at most one of the following. You will get a maximum of 30 additional extra credit points for your writing score. You will be graded on thoughtfulness and quality of writing.

I expect your written submissions to be thought through well, to be organized, and to be polished. For example, writing something on the morning of, and then submitting, will not get you many points.

1 How can we improve? (Minimum 1000 words)

Few things are perfect, and educational experiences rarely are.

Reflect on your experiences taking math classes at Texas State. What has gone well? What hasn't? Why?

Now let's talk about change. What could, or could have, improved your experiences? What do you wish you had known at the beginning? What do you wish you could change? Is there something the department could do to make things better? Something you could do? Something the state could do? Something your instructors could do?

Specific examples—to the extent you are comfortable—would be helpful.

2 Book project (Minimum 1000 words)

Read the book “The Shape of Space” by Jeffrey Weeks. Tell me some of what you learned, and some of your impressions.

3 Identities in mathematics (Minimum 1000 words)

Math does not happen in a vacuum—it is practiced by humans, and humans live in very particular contexts. In this project, I would like you to focus on elements you consider to be integral to your sense of identity (however

you'd like to construe that). How, if at all, have these elements affected your experiences (as a mathematician, or as a math student)?

(If you feel that this prompt is hogwash, the essay probably is not for you.)

4 Topology outside of theory (Minimum 1000 words)

Learn about an application of topology in a field outside of theoretical mathematics. Some major examples include Topological phases of matter and topological data analysis. Explain to the reader how topology helps solve the problems that are involved in these applications. When writing, follow the collaboration policy set forth for the class. Cite references as necessary.

5 Surfaces of genus g (Minimum 1000 words)

Read about the classification of compact surfaces—oriented or otherwise. (You may need to learn some new math for this.) How do you define the genus of a surface? Is your definition rigorous? Your exposition should be complete—in that it should be understandable to any student who has reasonably learned the material in this class—or any incompleteness should be pointed out in your writing. What else could you try to classify? Is the classification sensible? Do you understand the proof of the classification? Is $\mathbb{R}P^2$ a surface? Is it orientable? What is its genus? How do you know?