review think-pair-share
Dr. Sarah's MAT 1010: Introduction to Mathematics

Part A: Answer all the questions below and type your responses for the review think-pair-share forum. Add a new discussion topic with the subject as your preferred name and the post as your responses and any questions you have.

Part B: Respond separately to at least two of your classmates postings in a meaningful way. Use their preferred name (like Dr. Sarah is mine), with something new that justifies your position on (at least) one of the questions. Don't just say, "Yeah, I agree." Instead, say, "Yes preferred name, but we also need to consider..." Or, "Preferred name, I don't agree because..." You might also pose questions, answer questions, extend ideas, or compare and contrast your responses and summarize what you chose and why.

1. Equations are prevalent inside and outside of mathematics and even though this geometry segment was not as equation heavy as the algebra segment, we still saw plenty of equations. List the instances that equations appeared in our geometry segment (words that describe the situation and/or equations themselves are fine). List as many instances as you can remember.

2. Review these activities that we used to explore the geometry of the earth on the child's ball. In your notes, summarize what we did in the activities and what they showed us. For your posting, which activity did you find most convincing?

   a) car activity
   b) masking tape activity
   c) equator activity
   d) Chicago-Rome activity
   e) two great circles activity
   f) angle sum activity
   g) Pythagorean theorem activity

3. When/how do higher dimensions exist in real-life data?

4. What philosophical argument, experiment, or other justification is most compelling to you about whether the universe has finitely many or infinitely many stars?

5. What philosophical argument, experiment, or other justification is most compelling to you about whether the universe has a specific shape or not?

6. Choose a method or experiment that researchers have employed to determine whether our universe satisfies the laws of Euclidean, spherical, or hyperbolic geometry. In your notes, describe it. For your posting, list the method/experiment.

7. Discuss 2 of our classroom critiques of the method or experiment that you selected in the last question.

8. List an instance from the geometry segment where the theme of local to global played a role. What was local? global?

9. Critically analyze the role of probability and chance in the density experiments from the Jeff Weeks density experiments video in the universe hand in activity: how do $\frac{1}{3000}$ and (separately) "plus or minus"$\pm$ (margin of error for the curvature confidence interval) relate?

10. Which quote from Escher do you find most interesting?

    a) *The ideas... often bear witness to my amazement and wonder at the laws of nature which operate in the world around us... By keenly confronting the enigmas that surround us, and by considering and analyzing the observations that I had made, I ended up in the domain of mathematics* [The Graphic Work, 1954].

    b) *At first I had no idea at all of the possibility of building up my figures. I did not know any "ground rules" and tried, almost without knowing what I was doing, to fit together congruent shapes that I attempted to give the form of animals. Gradually, designing new motifs became easier as a result of my study of the literature on the subject, as far as this was possible for someone untrained in mathematics, and especially as a result of my putting forward my own layman's theory, which forced me to think through the possibilities. It remains an extremely absorbing activity* [Regular Division of the Plane, 1958].

    c) *The geometry of space translates to a reoccurring theme in my creations: the tessellation... had been considered solely in theory prior to me, some say. I diverged from traditional approaches, and chose instead to find solutions visually* [interview, January 17, 1971].

11. What real-life application was most compelling to you within our geometry class activities?

12. Name a change in world view that came with mathematical discoveries from the geometry segment activities and the benefit that resulted.

13. Reflect on this segment to discuss what is geometry?

14. What do you feel like you understood best from this geometry segment?

15. (optional) What, if any, questions do you have on the geometry segment concepts, computations, equations, visualizations, theoretical derivations, problem solving and analysis, or real-life connections?