Homework 12

Math 300, Fall 2022

This homework is due on Friday, November 11. (Turn in your answers to questions 1–6.)

0. *(This problem is not to be turned in.)* Read Sections 7.2 and 7.3.

   (a) Give an example of a partition of $\mathbb{R}$ that consists of 5 sets.

   (b) Section 7.2 #4, 7

   (c) Section 7.3 #2(d)

1. (a) List all partitions of the set $\{1, 2, 3, 4\}$. (No proof necessary.)

   (b) How many equivalence relations on $\{1, 2, 3, 4\}$ are there? Explain your answer. (*Hint:* Use your answer to (a).)

2. For any real number r, consider the following parabola:

$$P_r \quad = \quad \{(x, y) \in \mathbb{R} \times \mathbb{R} \mid y = x^2 + r\} \ .$$

   (a) Draw P_{-1}, P_0, and P_2 (as subsets of $\mathbb{R} \times \mathbb{R}$).

   (b) Does the set of all parabolas P_r form a partition of $\mathbb{R} \times \mathbb{R}$? Prove your answer.

   (c) Is there an equivalence relation on $\mathbb{R} \times \mathbb{R}$ for which the equivalance classes are the parabolas P_r? If so, define this equivalence relation. If not, explain why not.

3. Section 7.2 #4(b,c,f), 6

4. Section 7.3 #1(a), 2(a,b,c)

Writing Assignment 8

Math 300

This homework is due on **Monday, November 21** (in class).

- Extend your draft to include *all* sections of your final paper:

  1. the introduction (what will your paper be about?),
  2. the mathematical background (define and/or explain all unfamiliar terms),
  3. *three* sections developing main ideas, and
  4. a short discussion or conclusion.

- *Edit your draft in response to all comments received.*

- The required length is at least <u>seven pages</u>, excluding figures and bibliography.

- Your draft must meet the following style requirements:

  - double-spaced, 12-point font, 1-inch margins
  - pages must be numbered
  - figures from other sources must be credited

- *Please print 2 copies of your draft.*

- If you do **not** turn in this draft, you will receive a 5% penalty on the final paper.

IMPORTANT: The final report is due on *Monday, December 5* <u>emailed to the instructor, by 9 pm</u>. (The rubric was given earlier in the semester, and is available on the course website.)