Homework 7

Math 220 (section 906), Fall 2018

This homework is due on Thursday, October 11. (Turn in your answers to questions 1–7.) You may cite results from class, as appropriate.

0. *(This problem is not to be turned in.)* Read Section 4.3.

1. Let A and B be sets, and let $\mathcal{P}(A)$ and $\mathcal{P}(B)$ denote their respective power sets. *Prove or disprove:*

   (a) If $\{1\} \in \mathcal{P}(A)$, then $1 \in A$.

   (b) If $A \subseteq B$, then $\mathcal{P}(A) \subseteq \mathcal{P}(B)$.

   (c) If $A \in B$, then $\{A\} \in \mathcal{P}(B)$.

   (d) If $A \in B$, then $\{A\} \subseteq \mathcal{P}(B)$.

2. (No proofs necessary for this problem)

   (a) List the elements in $\mathcal{P}(\{1, 2\} \times \{0\})$.

   (b) List the elements in $\mathcal{P}([3, 4] \cap \mathbb{Z})$.

   (c) List the elements in $\mathcal{P}([3, 4]) \cap \mathbb{Z}$.

   (d) List the elements in $\mathcal{P}([3, 4]) \cap \mathcal{P}(\mathbb{Z})$.

3. True/False (no proofs necessary)

   (a) $\{3\} \in \mathcal{P}([3, 4])$

   (b) $\{3, 5\} \in \mathcal{P}([3, 4])$

   (c) $[3, 3.5] \in \mathcal{P}([3, 4])$

4. Consider the set $S = \{\ \{1, 2\},\ \{3\},\ \{4, 6\}\ \}$.

   (a) Is S a subset of $\mathcal{P}(\mathbb{Z})$? Explain briefly.

   (b) Is S an element of $\mathcal{P}(\mathbb{Z})$? Explain briefly.

5. Section 4.2 #12, 16, 18, 21, 22

6. Section 4.3 #2, 8, 10

7. Which topic or proof technique have you found most challenging so far in this class? Explain your answer in several sentences.

Writing Assignment 4

Math 220 (section 906), Fall 2018

This homework is due on Thursday, October 18.

- Write a draft of three 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), and
  3. one section developing one of the main ideas from Writing Assignment 3.
- The expected length is at least two pages.
- *Please print* 2 *copies of your draft. As part of a future writing assignment, each student, plus the instructor or grader, will critique another student's draft.*
- If you do **not** turn in this draft, you will receive a 5% penalty on the final paper.