

Homework 2

Math 302 (section 501), Fall 2016

This homework is due on Thursday, September 8.

0. (*This problem is not to be turned in.*)
 - (a) Read Section 2.2.
 - (b) (Practice Problems) Section 2.1 #4, 5, 7, 8, 14, 18, 23, 24, 27, 37
 - (c) (Practice Problems) Section 2.2 #6–10, 29, 32, 47, 32
1. Read Francis Su's *Guidelines for good mathematics writing*¹.
 - (a) List one thing from this document that was surprising or interesting to you.
 - (b) Pick one proof (some are labeled 'Solution') from Section 2.1 or 2.2 in your book, and analyze it with respect to Su's advice. Where do you see advice being followed (or not)?
2. Prove or disprove the following set equalities or containments²:
 - (a) If A and B are sets, then $A \cup (A \cap B) = A$.
 - (b) If A and B are sets, then $A \cap B = A \cup \overline{B}$.
 - (c) If A and B are sets, then $A \cap B \subseteq A \cup \overline{B}$.
 - (d) If A and B are sets, then $A \cap B \subsetneq A$.
 - (e) If A and B are sets, then $A \cap B \not\subseteq A$.
3. For $i \in \{1, 2, 3, \dots\}$, let $A_i = \{x \in \mathbb{Z} \mid x \leq i\}$. Compute the following, and prove your answer:
 - (a) $\bigcap_{i=1}^n A_i$ (where n is a positive integer).
 - (b) $\bigcup_{i=1}^n A_i$ (where n is a positive integer).
 - (c) $\bigcap_{i=1}^{\infty} A_i$.
 - (d) $\bigcup_{i=1}^{\infty} A_i$.
4. Section 2.2 # 4, 14, 26, 51, 52

¹Available here: <https://www.math.hmc.edu/su/math131/good-math-writing.pdf>

²For this problem, you must prove any set identities you want to use from Table 1 in your textbook.