Problem Set 1

[Your Full Name Here]

MATH 100 — Introduction to Proof and Problem Solving — Summer 2023

Problem 1.1. Let

$$A = \{\{\varnothing\}, d, \{a, c\}, b\}$$

(a) What is $|A|$?

Solution. □

(b) Which of the following are *elements* of A: a, b, c, $\{d\}$, $\{a, c\}$, $\{\{a, c\}, b\}$, $\varnothing$, $\{\varnothing\}$, $\{\{\varnothing\}\}$?

Solution. □

(c) Which of the following are *subsets* of A: a, b, c, $\{d\}$, $\{a, c\}$, $\{\{a, c\}, b\}$, $\varnothing$, $\{\varnothing\}$, $\{\{\varnothing\}\}$?

Solution. □

(d) Can A be the power set of some set?

Solution. □

(e) Write down a partition of A.

Solution. □

Problem 1.2. Let A be as above, and let $B = \{\{1\}, \{\varnothing\}, b, c\}$. What is

(a) $A \cap B$?

Solution. □

(b) $A \triangle B$?

Solution. □

(c) $\{\{1\}\}^c$ in $A \triangle B$?

Solution. □

(d) $(A \times B) \setminus \{(x, y) \in A \times B \mid x = \{\varnothing\} \text{ or } y = \{\varnothing\}\}$?

Solution. □

Problem 1.3. Let X and Y be sets. Prove that $X \triangle Y = (X \cup Y) \setminus (X \cap Y)$ using a Venn diagram.

Solution. □

Collaborators:

References:

- [Book(s): Title, Author]
- [Online: Link]
- [Notes: Link]

Fin.