

Seminar 1

Set Theory

- Enumerate all subsets of the set $\{1, 2, 3\}$!
- Let $X = \{0, 1, 2, \dots, 10\}$, $A = \{2, 4, 6, 8, 10\}$, $B = \{3, 6, 7, 8\}$. Find the following sets:
 - $A \cup B$
 - $A \cap B$
 - $X \setminus A$
 - $A \cap (X \setminus B)$
 - $A \setminus B$
 - $A \Delta B$
- Prove the de Morgan's laws!
- Which of the following statements are true? (A and B are arbitrary sets.)
 - $(A \setminus B) \subset (A \cup B)$
 - $(A \cap B) \subset A$
 - $(A \cap B) \subset (A \setminus B)$
 - $\overline{(A \cup B)} \subset \bar{A}$
 - $(A \setminus B) \not\subset B$
- Prove that $A \Delta B = \emptyset \iff A = B$ (proof by contradiction)
- Fill in the blanks with $\in, \ni, \subseteq, \supseteq, =$ or \neq
 - $2 \text{ ______ } \{2, 4, 6\}$
 - $\{2\} \text{ ______ } \{2, 4, 6\}$
 - $54 \text{ ______ } \{2, 4, 6, \dots\}$
 - $54 \text{ ______ } \{2, 4, 6\}$
 - $\{1, 3, 3, 5\} \text{ ______ } \{1, 3, 5\}$
 - $\{3, -1, 5\} \text{ ______ } \{3, 5, 1\}$