

Seminar 1
Set Theory

1. Enumerate all subsets of the set $\{1, 2, 3\}$!
2. Let $X = \{0, 1, 2, \dots, 10\}$, $A = \{2, 4, 6, 8, 10\}$, $B = \{3, 6, 7, 8\}$. Find the following sets:

a $A \cup B$	d $A \cap (X \setminus B)$
b $A \cap B$	e $A \setminus B$
c $X \setminus A$	f $A \Delta B$
3. Prove the de Morgan's laws!
4. Which of the following statements are true? (A and B are arbitrary sets.)

a $(A \setminus B) \subset (A \cup B)$	d $\overline{(A \cup B)} \subset \overline{A}$
b $(A \cap B) \subset A$	
c $(A \cap B) \subset (A \setminus B)$	e $(A \setminus B) \not\subset B$
5. Prove that $A \Delta B = \emptyset \iff A = B$ (proof by contradiction)
6. Fill in the blanks with $\in, \ni, \subseteq, \supseteq, =$ or \neq

a $2 ___ \{2, 4, 6\}$	d $54 ___ \{2, 4, 6\}$
b $\{2\} ___ \{2, 4, 6\}$	e $\{1, 3, 3, 5\} ___ \{1, 3, 5\}$
c $54 ___ \{2, 4, 6, \dots\}$	f $\{3, -1, 5\} ___ \{3, 5, 1\}$