

Homework #2

Due: 2013/10/03 P.M. 1:00

1. (5 points) Denotes the symmetric difference operator defined as,

$$A\Delta B = (A \cup B) - (A \cap B) \text{ where } A \text{ and } B \text{ are sets.}$$

(Don't use Venn diagram or disjunctive normal form in proof.)

1.1 Prove $(A\Delta B)\Delta A = B$ for all sets A and B .

1.2 Prove or disprove: $A\Delta(B - C) = (A\Delta B) - (A\Delta C)$ for all sets A , B , and C .

2. (10 points) Find recursive definition of $-: \mathbb{N}_0 \times \mathbb{N}_0 \rightarrow \mathbb{Z}$ (infix notation) with successor function σ and predecessor function ρ . Test it with '1 - 3'. Also, explain how to change definition to satisfy '1 - 3 = 0'.

3. \mathbb{N}_0 은 0을 포함한 자연수의 집합이다. $|\mathbb{N}_0 \times \mathbb{N}_0| = |\mathbb{N}_0|$ 임을 증명하고, 전단사함수(bijection) $f_1: \mathbb{N}_0 \rightarrow \mathbb{N}_0 \times \mathbb{N}_0$ 과 $f_2: (\mathbb{N}_0 \times \mathbb{N}_0) \rightarrow \mathbb{N}_0$ 를 각각 제시하시오. (10점)