Discrete Mathematics – Assignment 2
Sets and Functions

Due: 9:50am, Wednesday, Nov. 25, 2015

Use A4-size paper for your assignments, write legibly, and staple your assignments properly.

1. Prove or disprove the following. You may use the set identities in Table 1 of the textbook and $A - B = A \cap \bar{B}$ in your proof.

   (a) $A \cap (B - A) = (A - C) \cap (C - B)$

   (b) $A \cup (B - A) = A \cup B$

   (c) $(A \cup B) - C = (A - C) \cup (B - C)$

   (d) $C - (A \cup B) = (C - A) \cup (C - B)$

   (e) $(A - B) - C = (A - C) - (B - C)$

   (f) $(A - B) - C = (A - B) - (B - C)$

   (g) $A \bigoplus (B \cup C) = (A \bigoplus B) \cup (A \bigoplus C)$

   (h) $A \bigoplus (B \bigoplus C) = (A \bigoplus B) \bigoplus C$

2. Chap 2.2: Ex 50

3. Chap 2.3: Ex 72

4. For each of the following, give a bijection f from A to B. You should prove that f is a bijection.

   (a) $A = \mathbf{R}$, $B = \mathbf{R} - \mathbf{Z}^+$

   (b) $A = \{S \subseteq \mathbf{Z}^+ \mid S \text{ is finite}\}$, $B = \mathbf{Z}^+$

5. Chap 2.4: Ex 28

6. Chap 2.4: Ex 42

7. Chap 2.5: Ex 22

8. Show that the power set of $\mathbf{Z}^+$ is uncountable.