

CSCE 222 [503] Discrete Structures for Computing
Spring 2015 – Philip C. Ritchey

Problem Set 3

Due dates: Electronic submission of the PDF file for this homework is due on **2/12/2015 (Thursday) before 11:59 p.m.** on <http://ecampus.tamu.edu>. A signed paper copy of the PDF is due on **2/13/2015 (Friday)** at the beginning of class.

Name: (Han Hong)

Resources. Discrete Mathematics and Its Applications by Rosen, (additional people, books, articles, web pages, etc. that have been consulted when producing this homework)

On my honor, as an Aggie, I have neither given nor received any unauthorized aid on any portion of the academic work included in this assignment. Furthermore, I have disclosed all resources (people, books, web sites, etc.) that have been used to prepare this homework.

Signature: _____

Problem 1. (10 points) Section 2.1, Exercise 4, page 125

Solution.

- a. Second is a subset of first.
- b. Second is a subset of first.
- c. Neither is a subset of the other.

Problem 2. (10 points) Section 2.1, Exercise 10, page 125

Solution.

- a. F
- b. T
- c. T
- d. T
- e. F
- f. F
- g. T

Problem 3. (10 points) Section 2.1, Exercise 34, page 126

Solution.

- a. (a,a,a)
- b. (0,0,0),(0,0,a),(0,a,0),(a,0,0),(a,a,0),(a,0,a),(0,a,a),(a,a,a)

Problem 4. (10 points) Section 2.2, Exercise 2, page 136

Solution.

- a. $A \cap B$
- b. $A - B$
- c. $A \cup B$
- d. $\overline{A} \cup \overline{B} = \overline{(A \cap B)}$

Problem 5. (10 points) Section 2.2, Exercise 8, page 136

Solution.

- a. $A \cup B = x | (x \in A) \vee (x \in B)$ This is just a set A itself
 b. $A \cap B = x | (x \in A) \wedge (x \in B)$ This is just a set A itself

Problem 6. (10 points) Section 2.2, Exercise 16, page 136**Solution.**

- a. Assume $x \in (A \cap B)$ so $x \in A$ and $x \in B$. So, $x \in A$. Since $x \in (A \cap B)$ thus $x \in A$ and $(A \cap B) \subseteq A$.
 b. Assume $x \in A$. Then certainly $(x \in A) \vee (x \in B)$. So, $x \in A \cup B$. And since $x \in A \rightarrow x \in A \cup B$, then $A \subseteq A \cup B$.
 c. Assume $x \in A - B$ then $(x \in A) \wedge (x \notin B)$ making $x \in A$ thus $(x \in (A - B)) \rightarrow x \in A$, so $A - B \subseteq A$.
 d. Assume $x \in A \cap (B - A)$. So $x \in A$ and $x \in B - A$. Because of $x \in B - A$ then $x \in B$ and $x \notin A$. But $x \in A$! Contradiction, so our assumption $x \in A \cap (B - A)$ must be wrong. Thus $A \cap (B - A)$ must be empty.
 e. Assume $x \in A \vee (B - A)$. Then $x \in A$ or $x \in B - A$. If $x \in A$, $(x \in A) \vee (x \in B)$, so $x \in B$. So $x \in A$ or $x \in B$, which implies $x \in A \cup B$. Thus, $x \in A \vee (B - A) \rightarrow x \in A \cup B$, or $A \cup (B - A) \subseteq A \cup B$.

Problem 7. (10 points) Section 2.2, Exercise 46, page 136**Solution.****Problem 8.** (10 points) Section 2.3, Exercise 22, page 153**Solution.**

- a. Bijection
 b. No
 c. No
 d. Bijection

Problem 9. (10 points) Section 2.3, Exercise 42, page 154**Solution.**

- a. 1, 1
 b. $x \mapsto 1 - x$ if $x \in [0, 1]$
 c. $x \mapsto x$ if $x \in [2, 3]$

Problem 10. (10 points) Section 2.3, Exercise 56, page 154**Solution.**

- (b) - (a)
 (b) - (a) + 1
 (b) - (a)
 (b - a)
 None of above.

Checklist:

- () Did you add your **name**?
- () Did you disclose all **resources** that you have used?
(This includes all people, books, websites, etc. that you have consulted)
- () Did you **sign** that you followed the Aggie honor code?
- () Did you solve **every problem**?
- () Did you submit the PDF file of your homework on **eCampus**?
- () Did you submit a **signed and stapled** hardcopy of the PDF file **in class**?