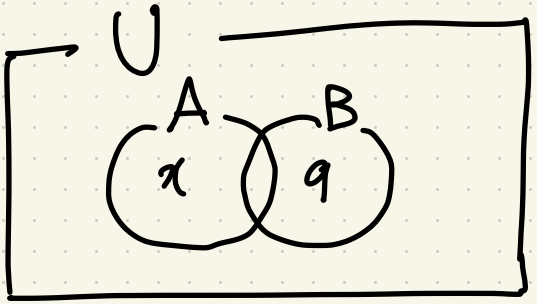
Software Mathematics – HW2

2020333762 장민호

1.



a) $\overline{A}$

b) $A \cap B$

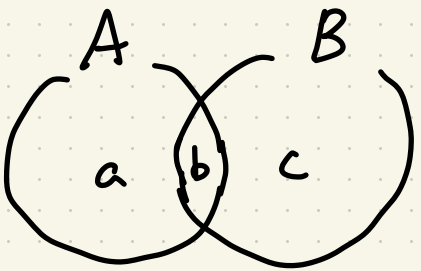
c) $A - B$

d) $\overline{A} \cap \overline{B}$

e) $(A \cup B) - (A \cap B) = A \oplus B$

5.

case 1



if A and B has an intersection.

$(A-B) = a$

$A = a \cup b$

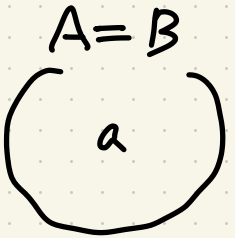
$A \cap B = b$,

So, $A - (A-B) = A \cap B$

$\because a \cup b - a = b$

is true

case 2



if $A \subseteq B$, $B \subseteq A$,

$A - B = \emptyset$

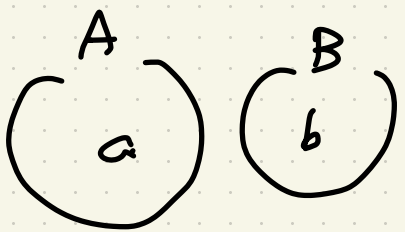
$A = a$

$A \cap B = a$

$\because a - \emptyset = a$

is true

case 3



if A and B are disjoint.

$A - B = a$

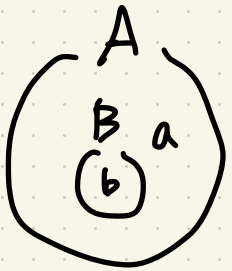
$A = a$

$A \cap B = \emptyset$

$\because a - a = \emptyset$

is true

Case 4:



if B is a subset of A,

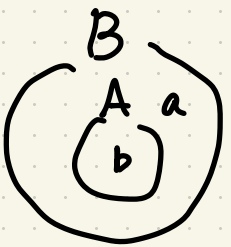
$A = a + b$

$A - B = a$

$A \cap B = b$

$\because a + b - a = b$

Case 5:



if A is a subset of B,

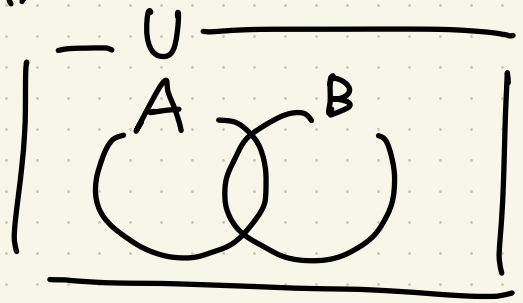
$A = b$

$A - B = \emptyset$

$A \cap B = b$

$\because b - \emptyset = b$

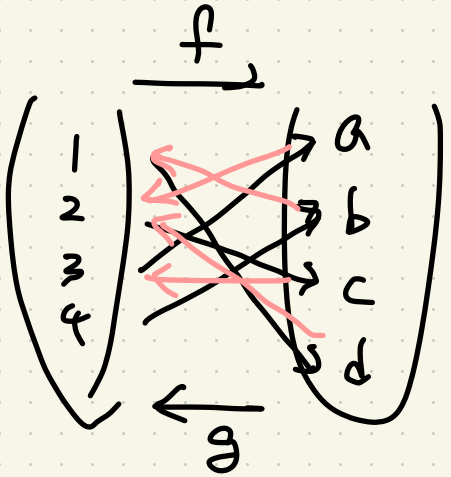
11.



a) $|\emptyset| \leq |A \cap B| \leq |A| \leq |A \cup B| \leq |U|$

b) $|\emptyset| \leq |A - B| \leq |A \oplus B| \leq |A \cup B| \leq |U|$

13.



a) f is one to one

g is not

b) f is onto function

g is not

c) $f^{-1}(a)=3$, $f^{-1}(b)=4$, $f^{-1}(c)=2$, $f^{-1}(d)=1$

g has no inversion

21.

$$\lceil x+y \rceil = \lceil x \rceil + \lfloor y \rfloor$$

let's assume that x is made up with integer α, and decimal β.

and y is also made up with integer r and decimal w

$\lceil x \rceil$ <
- $\beta > 0 \rightarrow \alpha+1$
- $\beta = 0 \rightarrow \alpha$

$\lfloor y \rfloor$ <
- $w > 0 \rightarrow r$
- $w = 0 \rightarrow r$

$\lceil x+y \rceil$
- $\beta+w > 1 \rightarrow \alpha+r+2$
- $\beta+w = 1 \rightarrow \alpha+r+1$
- $0 < \beta+w < 1 \rightarrow \alpha+r+1$
- $\beta+w = 0 \rightarrow \alpha+r$

$\lceil x \rceil$ < $\beta > 0 \rightarrow \alpha + 1$; $\beta = 0 \rightarrow \alpha$

$\lfloor y \rfloor$ < $w > 0 \rightarrow r$; $w = 0 \rightarrow r$

$\lceil x+y \rceil$ — $\beta + w > 1 \rightarrow \alpha + r + 2$; $\beta + w = 1 \rightarrow \alpha + r + 1$; $0 < \beta + w < 1 \rightarrow \alpha + r + 1$; $\beta + w = 0 \rightarrow \alpha + r$

So, there are two ways to satisfy an equation

first, if x and y are all integers.

second, if x and y has decimal part, r it is true only if the sum of the decimal parts does not exceed 1 and the decimal part of x is not zero.