

3/2 (1/2)

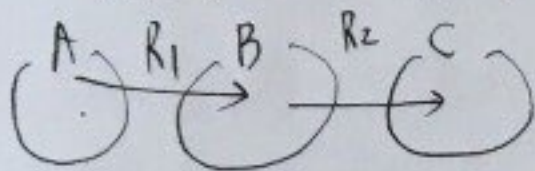
$R \subseteq A \times B$  ... a binary relation from the set A to the set B.  
 domain                      range

$(a,b) \in R \iff a R b$

$R \subseteq A \times A$  ... a binary relation on A

수학 - Definition  
 이 중요함

If  $A' \subseteq A$ ,  $R(A) = \{b \in B \mid (a,b) \in R\}$   
 $a \in A \text{ sat } \subseteq A \implies R(a)$  대신  $R(a)$   
 $a R b, a \in A$



$R_1 \circ R_2 \subseteq A \times C$

$R_1 \circ (R_2 \circ R_3) = (R_1 \circ R_2) \circ R_3$  is associative.

(Proof)?  $A = B \iff A \subseteq B \wedge B \subseteq A$

Let  $R \subseteq A \times A \iff G = (A, R)$

$A_0 = 6.02 \times 10^{23} = 6.02 \times (10^4)^5 \times 10^3$   
0 1 2 3 4 5  
 일 만 억 조 천 평 해  
 $= 602084$

Properties of Relations ( $R \subseteq A \times A$ )

1. Reflexive (자신자신)  
 자기규칙?

$\forall a \in A: a R a$ ,  $id_A \subseteq R \subseteq B(R)$

$id_A = \{(a,a) \mid a \in A\}$

2. symmetric (대칭성)

$a R b \implies b R a$

3. transitive

$a R b \wedge b R c \implies a R c$

$B(R)$   
 Boolean exp.

quiz 1) 2 을 증명하시오  
 2) 3 의 규칙 ( $B(R)$ ) 을 쓰고 증명하시오

Alg.  
 NP completeness.  
 tractable vs intractable  
 $O(n^k)$  vs  $O(k^n)$

[fixed k  
 n is a variable]

$\infty^k$  vs  $finite \infty$   
 countable vs uncountable  
 $\infty$  vs  $\infty$   
 computable

- Cantor's diagonal argument
- Russel's Paradox
- Gödel's Incompleteness Theorem
- Denial of Self Recursion
- Halting Problem