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Next Wed

6.1 (1, 2, a, b, 6)

6.2 (2, 3, 6)

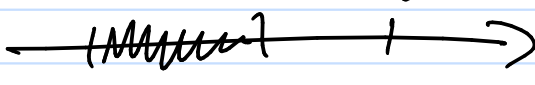
Prove

Relations: (binary relations)

Sets  $A_1, A_2$

subset of  $A_1 \times A_2 = \{(a,b) \mid \begin{matrix} a \in A_1 \\ \text{and} \\ b \in A_2 \end{matrix}\}$

$$|A_1 \times A_2| = |A_1| |A_2|$$

$$|-5| = 5$$


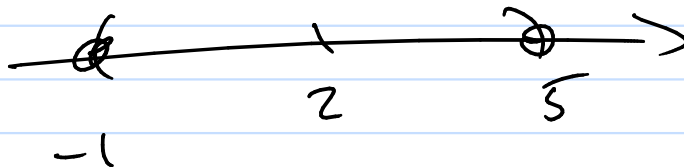
$$|x-2| = 3$$

$$x-2 = 3$$

$$x-2 = -3$$

$$x = 5$$

$$x = -1$$



$$\begin{aligned}
 |\text{relationships}| &= |P(A_1 \times A_2)| \\
 &= \sum |A_1 \times A_2| \\
 &= \sum |A_1| |A_2|
 \end{aligned}$$

(ex)  $R_1 = \{ \text{set of ordered pairs} \}$

(review  
Set theory)

(ex)  $A_1 = \{1, 2, 3, \dots, 10\}$

$A_2 = \{a, b, c, \dots, z\}$

$$|\{(1, a), (1, b), \dots, (10, z)\}| = 260$$

$$|\text{rel}| = 2^{260}$$

(ex)  $R_1 = \{(1, a), (2, z)\}$

$R_2 = \{(1, a), (1, b), (2, c), (3, d)\}$

List Power

Set Builder

$$R_1 = \{(e_1, e_2) |$$

$$A_1 = \{1, 2, 3, \dots\}$$

$$A_2 = \{1, 2, 3, \dots\}$$

$$R_1 = \{ (x, y) \mid x = y + 3 \}$$

$$y = x - 3$$

$$= \{ (4, 1), (5, 2), (6, 3), \dots \}$$

$P(x, y)$

$$(4, 1) \in R_1$$

$$4 R_1 1$$

$$(x, y) \in r$$

$$x r y$$

$$A_1 = \{2, 3, 4, 5, 6\} = A_2$$

Subset  $(A_1) \times (A_2)$

Same?

Subset  $A_1 \times A_1$

relationship on  $A_1$

$\{2, 3, 4, 5, 6\}$

$$r = \{ (x, y) \mid x|y \}$$

$$= \{ (2, 2), (2, 4), (2, 6), (3, 3), (3, 6), (4, 4), (5, 5), (6, 6) \}$$

Def

$a|b$  if and only if

there exists an integer  $k$ ,  $a \cdot k = b$

$$b = a \cdot k + \boxed{0} \text{ remainder}$$

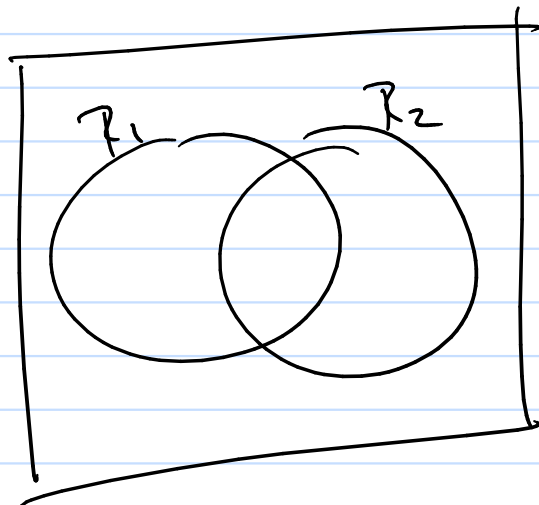
What to do with relations?

#1

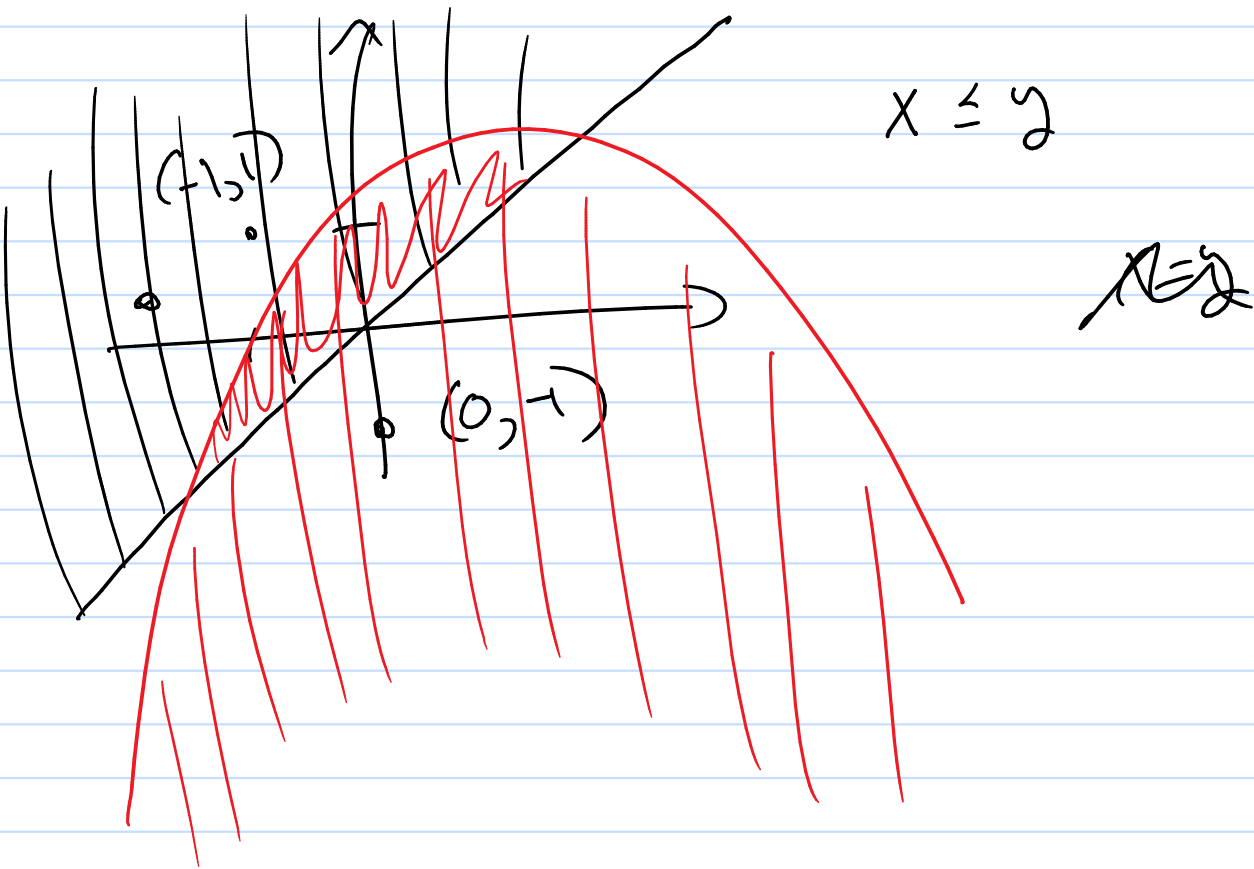
Set Operations!

$$R_1 \cup R_2$$

$$= \{ (a, b) \mid aR_1b \vee aR_2b \}$$

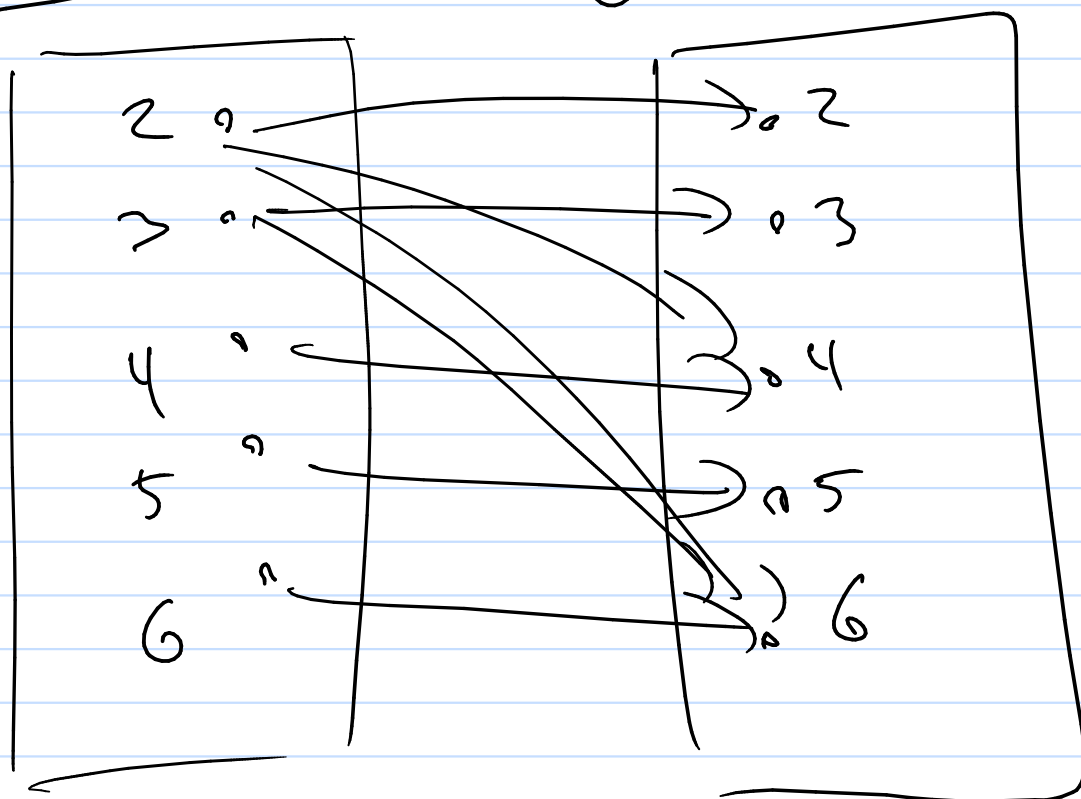


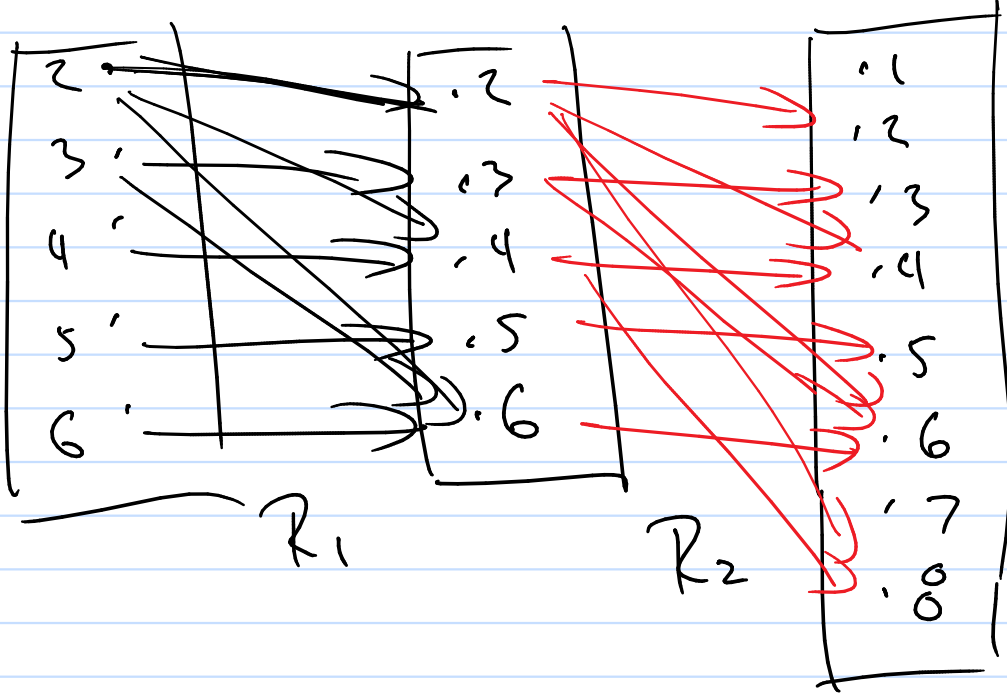
$$R_1 \cap R_2 = \{ (a, b) \mid aR_1b \wedge aR_2b \}$$



Visualize domain to codomain

use arrow diagram





Compositura B

folow  $R_1$  then  $R_2$

Ukuran:

Schetras:

$$(2, 4) \in R_1$$

$$4 = R_1(2)$$

Compositura:

$$R_2(R_1(a)) = C$$

Calc book  
Func.  
Notabha

$R_2 \circ R_1$   $R_1$  composed with  $R_2$

this book

$R_1 R_2$

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