

$$1) a = \{10, 9, 8, 7\} \quad b = \{8, 7, 6, 5\}$$

Adam

\therefore IRREFLEXIVE

- no loop at every vertex
- diagonal are all 0

2)
Najmi

$$\begin{array}{c}
 a \\
 b \\
 c \\
 d
 \end{array}
 \begin{array}{c}
 a \quad b \quad c \quad d \\
 \left(\begin{array}{cccc}
 1 & 1 & 0 & 1 \\
 0 & 1 & 1 & 0 \\
 0 & 0 & 1 & 1 \\
 1 & 0 & 0 & 1
 \end{array} \right)
 \end{array}$$

reflexive = 1 on every diagonal ✓

$$\text{transitive} = \begin{pmatrix} 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 1 \end{pmatrix} \otimes \begin{pmatrix} 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 \end{pmatrix}$$

\therefore not-transitive

hence, not equivalence relation because it's not transitive.

$$3a) f(x, y) = (2x - y, x - 2y)$$

Misya

$$x = 2x - y$$

$$x_1 = x_2 \iff f(x_1) = f(x_2)$$

$$\therefore f(x_1) = f(x_2)$$

$$\cancel{2}x_1 - \cancel{y} = \cancel{2}x_2 - \cancel{y}$$

$$x_1 = x_2 \longrightarrow 1 \text{ to } 1$$

$$f(y_1) = f(y_2)$$

$$\cancel{x} - \cancel{2}y_1 = \cancel{x} - \cancel{2}y_2$$

$$y_1 = y_2 \longrightarrow 1 \text{ to } 1$$

$$3b) f^{-1}$$

Adam

$$a = 2x - y$$

$$b = x - 2y$$

$$x = \frac{a + y}{2}$$

$$y = -\frac{b - x}{2}$$

$$x = \frac{a + \left(-\frac{b - x}{2}\right)}{2}$$

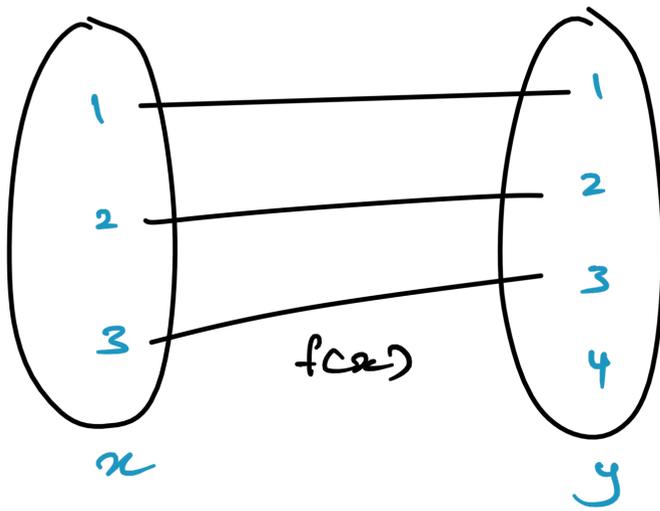
$$y = -\frac{b - \left(\frac{a + y}{2}\right)}{2}$$

$$x = \frac{4a - b + x}{4}$$

$$y = \frac{-4b + a + y}{4}$$

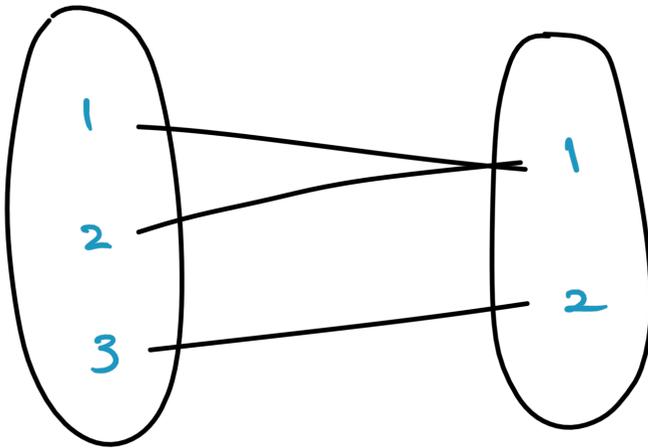
$$f^{-1} = \left(\frac{5x - y}{4}, \frac{-3y + x}{4} \right)$$

4a)
Nisya



$$\rightarrow f(x) = y$$

4b)
Najmi



$$\rightarrow g(x) = w$$

5i) given $f(x) = x^3$, $g(x) = x - 1$

Najmi

$$gf(x) = x^3 - 1 \rightarrow f \text{ inside } g$$

$$fg(x) = (x - 1)^3 \rightarrow g \text{ inside } f$$

5ii) Assume $x = 5$

Nisya

$$gf(5) = 5^3 - 1 = 124$$

$$fg(5) = (5 - 1)^3 = 64$$

not equal

$$b) A = \{0, 1\}$$

Adam

$$⑥ A = \{0, 1\}$$

n	string		a_n
0	1	(0)	$a_0 = 1$
1	2	(0, 1)	$a_1 = 2$
2	3	(00, 01, 10, 11)	$a_2 = 3$
3	4	(000), (100, 110, 111)	$a_3 = 4$
4	5	(0000), (1000, 1100, 1110, 1111)	$a_4 = 5$
5	6	(00000), (10000, 11000, 11100, 11110, 11111)	$a_5 = 6$

$$a_n = a_{n-1} + 1$$

$$a_1 = a_{1-1} + 1$$

$$= a_0 + 1$$

$$= 1 + 1$$

$$= 2$$

79) $C_1 = 0$ Najmi + Misya

$$C_2 = 1$$

$$C_3 = 1$$

$$C_n = C_{n-2} + C_{n-3}$$

$$C_4 = 1 + 0 = 1$$

$$C_5 = 1 + 1 = 2$$

$$C_6 = 1 + 1 = 2$$

$$C_7 = 2 + 1 = 3$$

$$C_8 = 2 + 2 = 4$$

$$n \geq 4$$

→ Input = n

→ Output = C_n

→ C_n

→ { if $n = 1$ || $n = 2$ || $n = 3$ }

→ return 1

→ return $C_{n-2} + C_{n-3}$

→ }