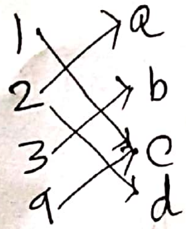
AL-EMRAN (A20MJ4003)

Assignment 1(b)

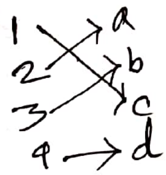
1. $A = \{1, 2, 3, 4\}$

$B = \{a, b, c, d\}$

a) 

So, relation of $f = \{(1,c), (2,a), (3,b), (4,3), (2,d)\}$ is one-to-one but it's an onto because for one-toone. There must be an unique relationships among them.

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



Here is an unique relation. So, both relation is one-to-one and on-to.

Ans to the Qus No. 2

$X = \{0, 1, 2, 3, 4\}$ is defined an $f(x) = 2n \bmod 5$

a) $f(0) = 2 \times 0 \bmod 5$
$= 0$

$f(1) = 2 \times 1 \bmod 5$
$= 2$

$f(2) = 2 \times 2 \bmod 5$
$= 4$

$f(3) = 3 \times 2 \bmod 5$
$= 0$

b) f is an one-to-one function.

c) f is not onto function.

Ans to the Qus No. 3

a) $f(x) = 4x^3 - 5$

$y = 4x^3 - 5$

$\Rightarrow 4x^3 = y - 5$

$\Rightarrow x^3 = \frac{y-5}{4}$

$\Rightarrow x = \sqrt[3]{\frac{y-5}{4}}$

$\Rightarrow f^{-1}(x) = \frac{\sqrt[3]{x-5}}{4}$ Ans.

(b) $f(x) = 7 + \frac{1}{x}$

$y = 7 + \frac{1}{x}$

$\Rightarrow \frac{1}{x} = 7 + y$

$\Rightarrow x = \frac{1}{7+y}$

$\Rightarrow f^{-1}(x) = \frac{1}{7+x}$ Ans.

~~(b)~~

Ans to the Qus No. 4

a) $f(n) = 2n + 1$

$g(n) = 3n - 1$

$fof = f(f(n))$

$= f(2n+1)$

$= 2(2n+1) + 1$

$= 4x + 3$

(b) $gof = (g(f(n)))$

$= g(2n+1)$

$= 3(2n+1) - 1$

$= 6n + 3 - 1$

$= 6n + 2$ Ans.

Ans to the Qus. No. 5

$S_n = 1^2 + 2^2 + 3^2 + \cdots + n^2$

formula, $S_n \Rightarrow S_n = S_{n-1} + n^2$

$S_4 = S_{4-1} + 4^2$

$= S_3 + 16$

1.b

Ans to the Qus No. 6

a) R is a relation of

Set A = {9, 5, 6}

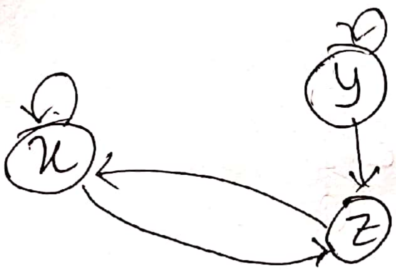
Set B = {9, 3, 2}

R = {(9,2) (9,3),(6,9)} Ans

b) R = {(5,9),(5,3), (5,2) (6,9),(6,3),(6,2),(7,9),(7,3),(7,2)}

Ans.

Ans to the Qus No. 7.



Ans to the Qus No. 8

$$M_R = \begin{array}{c|ccc} & x & y & z \\ \hline x & 1 & 0 & 1 \\ y & 0 & 1 & 1 \\ z & 1 & 0 & 0 \end{array}$$

Ans to the Qus No. 9

R = {(a,b) (a,d),(b,b),(d,c),(c,d)}

Ans to the Qus No. 10

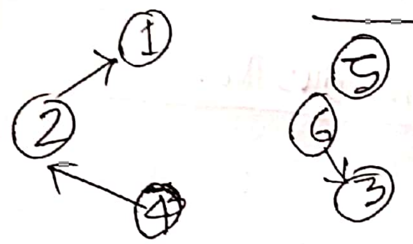
$$M_R = \begin{array}{c|cccc} & a & b & c & d \\ \hline a & 0 & 1 & 0 & 1 \\ b & 0 & 1 & 0 & 0 \\ c & 0 & 0 & 0 & 1 \\ d & 0 & 0 & 1 & 0 \end{array}$$

Ans to the Qus. No. 11

$$M_R = \begin{array}{c|cccc} & 1 & 2 & 3 & 4 \\ \hline 1 & 1 & 1 & 1 & 0 \\ 2 & 0 & 0 & 0 & 1 \\ 3 & 1 & 0 & 1 & 0 \\ 4 & 0 & 1 & 0 & 1 \end{array}$$

$R = \{(1,1),(1,2),(1,3),(2,4),(3,1),(3,3),(4,2),(4,4)\}$

Ans to the Qus. No. 12



- R is not reflexive.
- it is not symmetric.
- It is not transitive.
- It is anti symmetric.
- It is also not partial.

Ans to the Qus No. 13

a) $R = \{(1,2),(2,3),(3,4),(4,5)\}$

b) Domain of R is $\{1,2,3,4\}$

c) Range of R is $\{2,3,4,5\}$

d)