



SECI1013: DISCRETE STRUCTURE  
SEM 1 2023/2024

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Marks  
133/150  
15

## Question 1

[3 Marks]

Fill in the blank with correct properties that relation could be reflexive/ irreflexive/ symmetric/ anti-symmetric/ transitive. (One answer only)

- a. Nothing is related to itself irreflexive (1m)  
b. No one-way streets symmetric (1m)  
c. Whenever there's a roundabout route, there's a direct route transitive (1m)

## Question 2

[3 Marks]

Given the relation  $\{(-7,2), (0,4), (2,-1), (-3,0), (-3,3)\}$

- a. State the domain and range of the relation (1m)  
b. Determine whether the relation is function and explain (1m)  
c. Create a mapping diagram of the relation (1m)

## Question 3

[6 Marks]

Given a pair of functions,  $f(x)=3/(2x+1)$ ,  $g(x)=2/x$ . Find:

- a.  $(g \circ f)(x)$  3/4  
b. Domain of function. integer number, real number (3m)  
c. Domain of function. integer number, real number except 0 (3m)

## Question 4

[3 Marks]

Given an arithmetic sequence 5, 37/7, 39/7, 41/7 ....

- a. Find the sequence recursive formula (1m)  
b. Write a Pseudo-code for function  $a(n)$  (2m)

a)  $a_n = a_{n-1} + \frac{2}{7}, n \geq 1, a_0 = 5$  | b) input = n  
output =  $a(n)$   
 $a_1 = a_0 + \frac{2}{7} = 5 + \frac{2}{7} = \frac{37}{7}$   
 $a_2 = a_1 + \frac{2}{7} = \frac{37}{7} + \frac{2}{7} = \frac{39}{7}$   
 $a_3 = a_2 + \frac{2}{7} = \frac{39}{7} + \frac{2}{7} = \frac{41}{7}$   
 $a(n) \{$   
if (n=0)  
return 5  
return  $a(n-1) + \frac{2}{7}$   
}

2)  $\{(-7, 2), (0, 4), (2, -1), (-3, 0), (-3, 3)\}$

a. domain =  $\{0, 2, -3, -7\}$

range =  $\{-1, 0, 2, 3, 4\}$

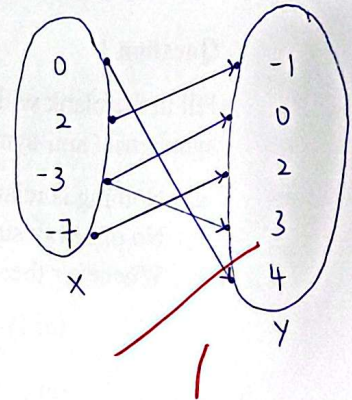
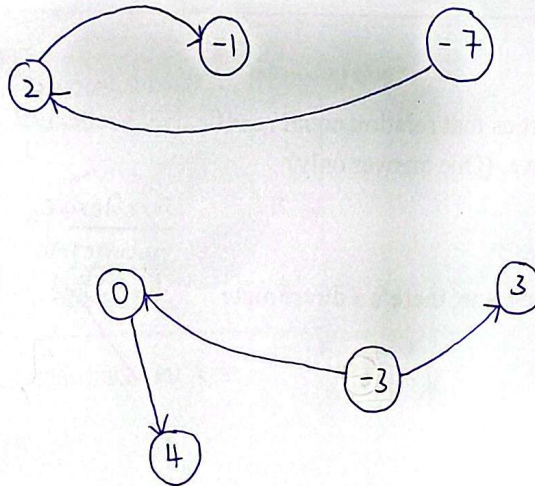
$f(x_1) = f(x_2)$

$x_1 \neq x_2$

b. the relation is not a function as value of  $x$  is repeated.

not completed. 1  
X

c.



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