



SECI1013: DISCRETE STRUCTURE  
SEM 1 2023/2024

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Marks
<u>14.25</u> / 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 reflexive transitive (1m)

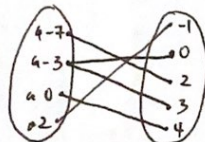
## Question 2

[3 Marks]

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

- a. State the domain and range of the relation domain =  $\{-7, -3, 0, 2\}$  range =  $\{-1, 0, 2, 3, 4\}$  (1m)  
b. Determine whether the relation is function and explain (1m)  
c. Create a mapping diagram of the relation The relation is not a function because  $(-3,0)$  and  $(-3,3) \in R$  this show one-to-many relation and one-to-many relation is not a function. (1m)

c)



## Question 3

[6 Marks]

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

- a.  $(g \circ f)(x)$   $g(f(x)) = g\left[\frac{3}{2x+1}\right] = \frac{2}{\frac{3}{2x+1}} = \frac{4x+2}{3}$   
b. Domain of function.  $f(x) = \{x \mid \text{real number } \in x, x \neq -\frac{1}{2}\}$   
 $g(x) = \{x \mid \text{real number } \in x, x \neq 0\}$

## Question 4

[3 Marks]

Given an arithmetic sequence  $5, 37/7, 39/7, 41/7, \dots$

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

a)  $a_0 = 5$   
 $a_1 = 5 + \frac{2}{7}$   
 $a_2 = a_1 + \frac{2}{7}$   
 $\therefore a_n = a_{n-1} + \frac{2}{7};$   
 $n \geq 1$

b) 1. Start  
2.  ~~$a(n)$~~   $a_0 = \frac{37}{7}$   
3.  $a(n)$

$a(n) \{$   
if  $(n=0)$   
return 5  
return  $a(n-1) + \frac{2}{7}$   
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