SECI1013: DISCRETE STRUCTURE QUIZ 2(SEM 1 2024/2025)

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Marks 14½ / 15

Question 1 **[3 Marks]**

Determine whether set {(1, c), (2, a), (3, b), (4, c)} is a function *f* from X ={1, 2, 3, 4} to Y = {a, b, c, d}. Find its domain, co-domain and range.

It is a function, $X \to Y$

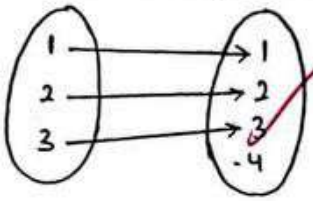
Domain : {1, 2, 3, 4} Range : {a, b, c}

Co-domain : {a, b, c, d}

Question 2 **[5 Marks]**

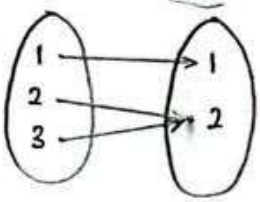
Let X = {1, 2, 3}, Y = {1, 2, 3, 4} and W = {1,2}.

i. Draw the arrow diagram to define function *f*: $X \to Y$ that is one-to-one but not onto.



(2 Marks)

ii. List the three ordered pairs to define function *g*: $X \to W$ that is onto but not one-to-one.



g(x) : {(1,1), (2,2), (3,2)}

(3 Marks)

Question 3 **[7 Marks]**

Given $g(x) = \frac{5x}{x-3}, x \neq j$

i. What is the value of *j*? What happens if x = j?

j = 3 $g(3) = \frac{5(3)}{3-3} = \frac{15}{0}$ error

ii. Find $g \circ g$

$g \circ g = g(g(x))$

$= \frac{5\left(\frac{5x}{x-3}\right)}{\frac{5x}{x-3} - 3} = \frac{\frac{25x}{x-3}}{\frac{5x}{x-3} - \frac{3(x-3)}{1(x-3)}} = \frac{\frac{25x}{x-3}}{\frac{5x-3x+9}{x-3}} = \frac{\frac{25x}{x-3}}{\frac{2x+9}{x-3}}$

iii. Find g^{-1}.

$= \frac{25x}{x-3} \times \frac{x-3}{2x+9} = \frac{25x(x-3)}{(x-3)(2x+9)} = \frac{25x^2 - 75x}{2x^2+9x-6x-27} = \frac{25x^2-75x}{2x^2+3x-27}$

$= \frac{25x(x-3)}{2x^2+3x-27}$ $\frac{25x}{2x+9}$

6½