

EXERCISES

Discrete Mathematics
INW

TT-39-INT



No. 1

Let the function $f: A \rightarrow B$, $g: B \rightarrow C$, $h: C \rightarrow D$ be defined by Figure. 1.

Determine if each function is:

- Onto
- One-to-one
- Invertible

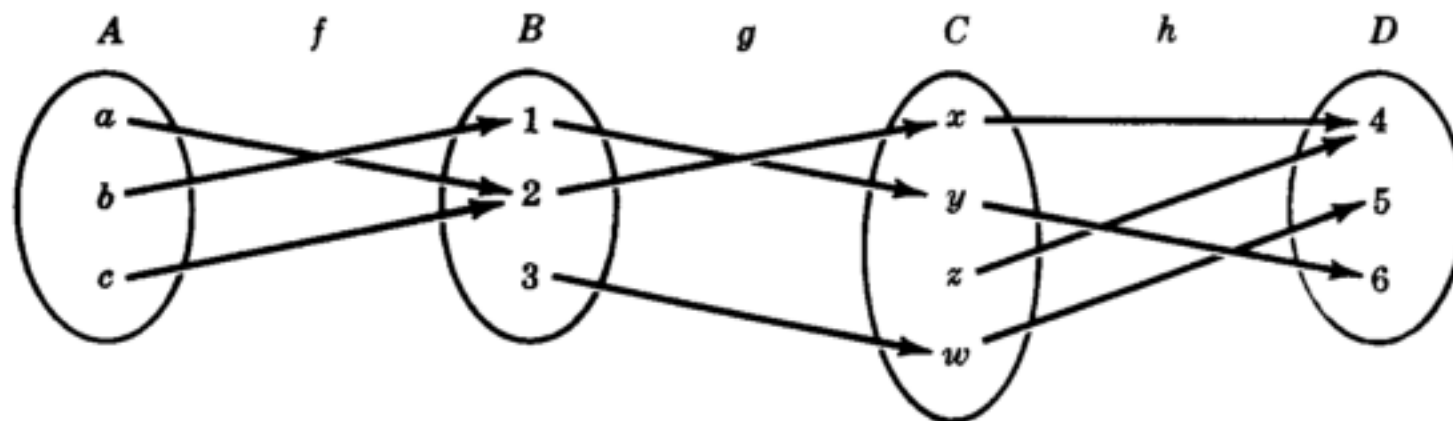


Figure. 1

No. 2

- a. Let $A = \{a, b, c\}$, $B = \{x, y, z\}$, $C = \{r, s, t\}$. Let $f: A \rightarrow B$ and $g: B \rightarrow C$ be defined by:
 $f = \{(a, y), (b, x), (c, y)\}$ and $g = \{(x, s), (y, t), (z, r)\}$

Find:

- i. Composition function $g \circ f : A \rightarrow C$
 - ii. Image of function f ($\text{Im}(f)$)
 - iii. Image of function g ($\text{Im}(g)$)
 - iv. Image of $g \circ f$ ($\text{Im}(g \circ f)$)
- b. Let f and g be the functions from the set of integers to the set of integers. Defined by $f(x) = 2x + 3$ and $g(x) = 3x + 2$. What is the composition of f and g ? What is the composition of g and f ?
- c. Find the composition function $h \circ g \circ f$ for the functions in Figure.1 (Number 1)

No. 3

- a. Let f be the function from $\{a, b, c\}$ to $\{1, 2, 3\}$ such that $f(a) = 2$, $f(b) = 3$ and $f(c) = 1$.
Is f invertible and if it is, what is its inverse?
- b. Sketch the graph of:
- $f(x) = x^2 + x - 6$
 - $g(x) = x^3 - 3x^2 - x + 3$