

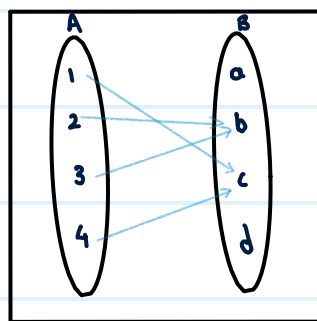
* Functions

$$f: A \rightarrow B$$

$$\text{Domain} = \{1, 2, 3, 4\}$$

$$\text{Codomain} = \{a, b, c, d\}$$

$$\text{Range} = \{b, c\}$$



* Special Types of Functions

One to One Function

→ sabke alag alag (Monogamy)

→ Every element of A has distinct image in B

→ Injective

Many to one function

→ Cucks or Polygamy

→ Two or more elements of A has same image in B.

Onto function [Surjective]

→ No lonely niggas allowed

→ Every element in B has atleast one pre image in A

Into function

→ Single nums
in Your Area

↪ Atleast one element in B having no pre image in A

One to One or Onto Function (Bijective)

↪ Both Injective & Surjective

↪ One to One & Onto

288 512

Example 6.13.3 Let $f(x) = x+2$, $g(x) = x-2$, $h(x) = 3x$, for $x \in \mathbb{R}$ Where \mathbb{R} is the set of real numbers

Find i) $g \circ f$ ii) $f \circ g$ iii) $f \circ f$ iv) $h \circ g$ v) $g \circ g$ vi) $f \circ h$ vii) $h \circ f$ viii) $f \circ h \circ g$ ix) $g \circ f \circ h$.

$f(x) = x+2$ $g(x) = x-2$ $h(x) = 3x$	$f \circ g = f(g(x))$ $= f(x-2)$ $= x-2+2$ $= x$	$f \circ f = f(f(x))$ $= f(x+2)$ $= x+2+2$ $= x+4$	$h \circ g = h(g(x))$ $= h(x-2)$ $= 3(x-2)$ $= 3x-6$	$g \circ g = g(g(x))$ $= g(x-2)$ $= x-2-2$ $= x-4$
$f \circ h = f(h(x))$ $= f(3x)$ $= 3x+2$	$f \circ h \circ g = f(h(g(x)))$ $= f(h(x-2))$ $= f(3(x-2))$ $= 3(x-2)+2$ $= 3x-6+2$ $= 3x-4$			

Pigeon hole Principle

if there are $n+1$ pigeons & only n pigeon holes then
2 pigeons will share same hole

Extended pigeon hole principle (Generalized pigeon hole)

$n \rightarrow$ pigeons n

$m \rightarrow$ holes m

rrrrr (P) (P)

then one pigeon must occupy $\rightarrow \left(\frac{n-1}{m}\right) + 1$ pigeons