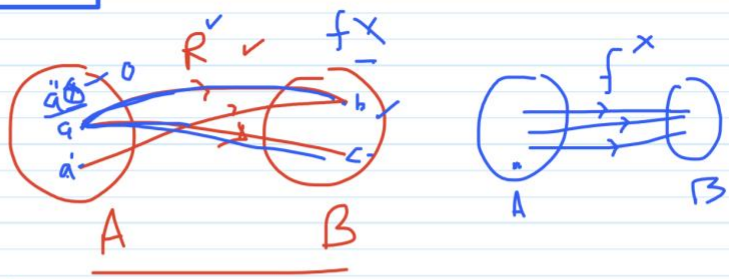
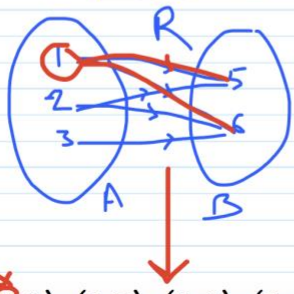
FUNCTIONS



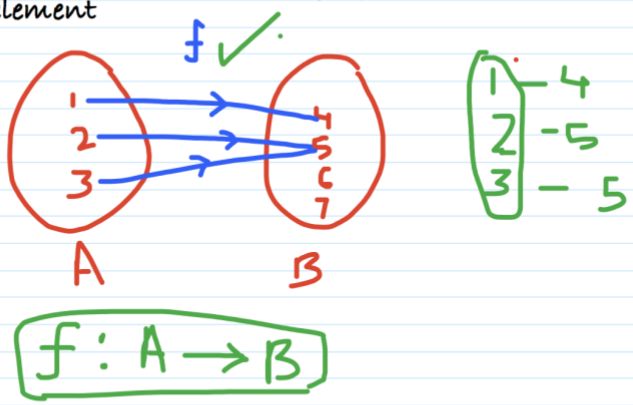
1. A relation f from set A to set B, is said to be function if for every element of set A has one and exactly one image in set B



R = {(1,5), (1,6), (2,5), (2,6), (3,6)}

Domain of f = A

No two distinct ordered pairs in f have the same first element



$f : A \rightarrow B$

If (a,b) ∈ f, then

f(a) = b

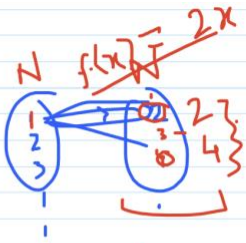
b -> Image of a under f

a - preimage of b under f

Ex - $R = \{(x,y) : y = 2x \text{ and } x, y \in N\}$

What is the Domain, Codomain, and Range of R ?

Is this relation a function? ✓ Yes



Soln:

$R = \{(1, 2), (2,4), (3,6), (4,8), \ldots\ldots (k,2k), \ldots\ldots\}$

Domain = $\{1, 2, 3, 4, 5, \ldots\ldots\} = N$ ✓

Range = $\{2, 4, 6, 8, 10, \ldots\ldots\}$ = Even Numbers

Codomain = N

$\subseteq \mathbb{R}$ Range $\subseteq$ Real no.

Real functions and Real-valued functions

Domain ⊆ R

Range ⊆ R

$f(x) = 2x + 5$ ✓

$x \in N$

$\in N$

Ex - $f: R \to R$ by $y = f(x) = x^2$, $x \in R$

What is the Domain, Range of this function ?

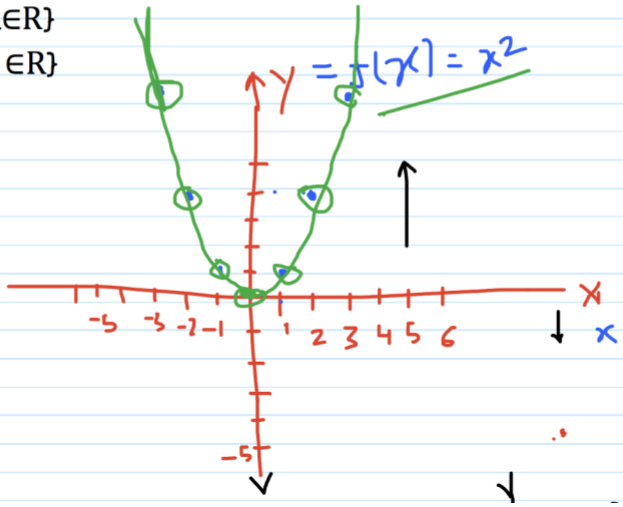
Draw graph of f.

Sol:

Domain = $\{x : x \in R\}$

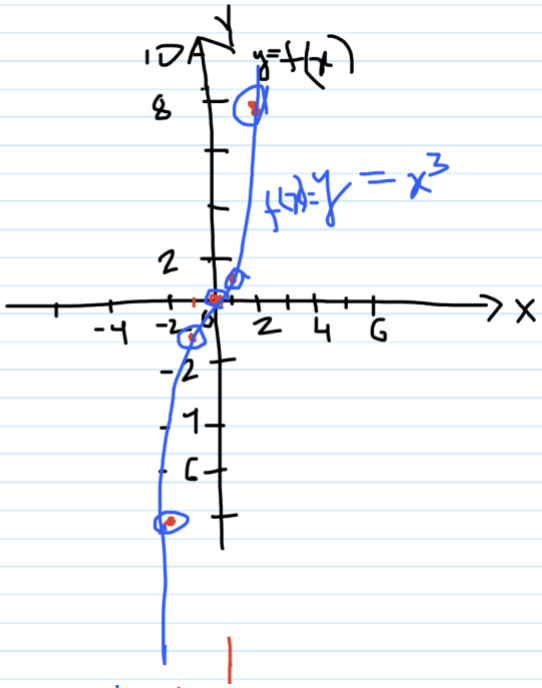
Range = $\{x^2 : x \in R\}$

x	y = f(x)
1	1
2	4
3	9
0	0
-1	1
-2	4
-3	9



$y = x^3$

x	$y = f(x) = x^3$
0	0
1	1
2	8
3	27
-1	-1
-2	-8
-3	-27



$f: R - \{0\} \to R$, defined by

$f(x) = 1/x$, $x \in R - \{0\}$

x	$y = f(x) = \frac{1}{x}$
1	1
2	1/2 = 0.5
3	1/3 = 0.33
4	0.25
5	0.2
-1	-1
-2	-0.5
-3	-0.33
0.5	2
0.33..	3
0.2	5 = 1/0.2
0.1	10
0.05	20
-0.1	-10
-0.5	-2