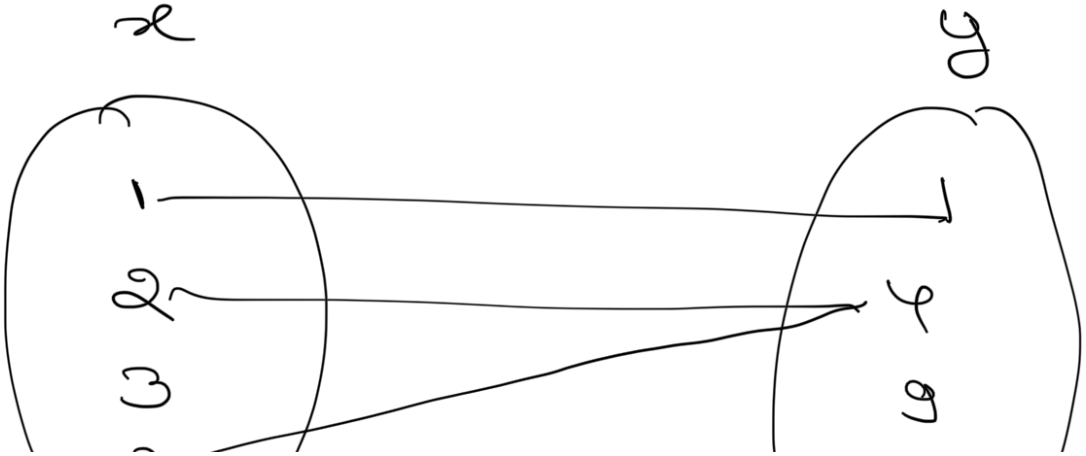
Basic Calculus : Part 1

- Functions
- Domain Range
- Common type of Function
- Continuity of a Function
- Limits → [Left hand Limit, Right hand Limit]
- Derivatives / Slope

Function

- a set of rules that convert input to output
- A mapping between input and Output



input

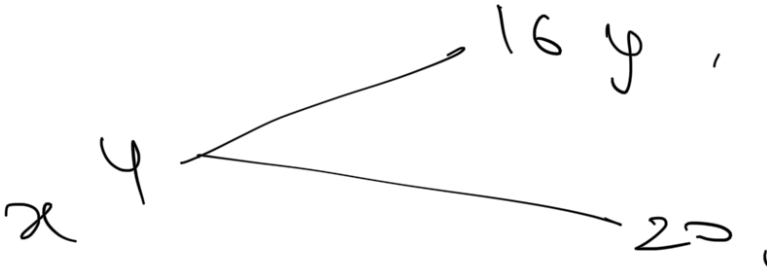
Domain

$y = x^2$

output

Range

→ Proper function cannot give two distinct outputs for a single input



$y = \sqrt{x}$

$x = 16$, ~~-4~~ , 4^2

always positive

$y \ni x + 4$

$y = x + 3$

- One to many ✗
- many to one ✓
- One to one ✓
- many to many ✗

Domain ⇒ All the possible values x can take
Range ⇒ All the possible outputs (y)

2

$y \Rightarrow x$

D ⇒ ? $(-\infty, \infty)$

Range ⇒ $[0, \infty)$

$y \Rightarrow \sqrt{x}$

D ⇒ $(0, \infty)$

R ⇒ $[0, \infty)$

2) $2x^2 + 3x - 4$

D ?: $(-\infty, \infty)$

R: ? $[-5.125, \infty)$

3) Step function

$$y = \begin{cases} 1 & : x > 0 \\ 0 & : x \leq 0 \end{cases}$$

D ⇒ $(-\infty, \infty)$

R ⇒ $\{1, 0\}$

$(0, 1)$