

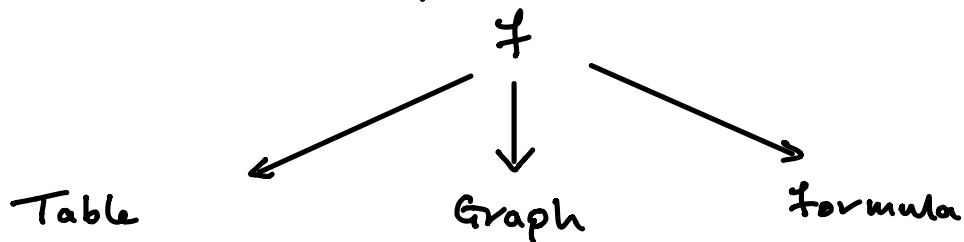
Functions and their Properties

D = subset of real numbers (decimal numbers)

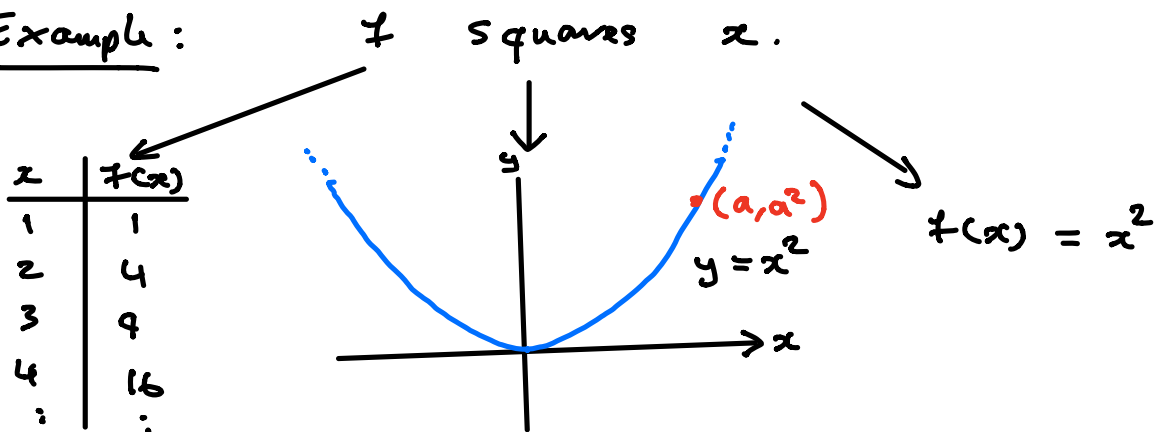
Definition

A function f , with domain D , is a rule which assigns to every x in D exactly one number, denoted $f(x)$.

Three ways to represent function :

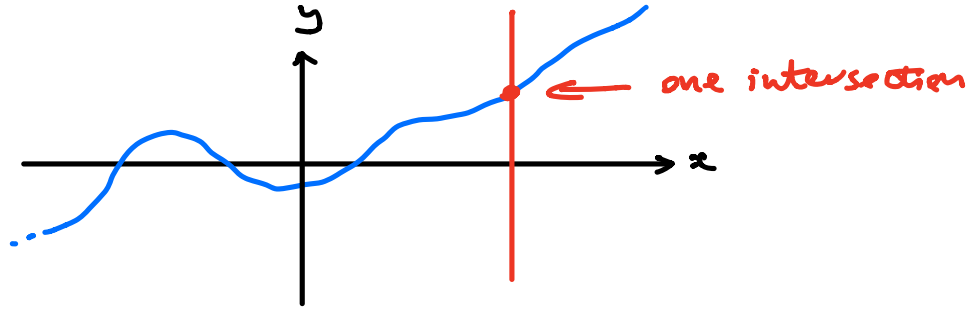


Example :

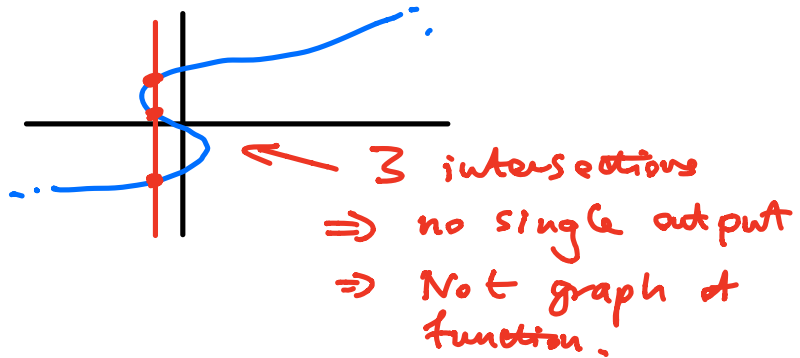


Vertical Line Test : A curve in xy -plane is graph of function if and only if any vertical line crosses curve at most one.

Example :



Non-example :



Agreement on Domains: If f is given by formula alone, the domain of f is all possible x for which $f(x)$ makes sense.

Example $f(x) = \frac{\sqrt{x}}{x-3}$

Domain = $x \geq 0$ such that $x \neq 3$.

Interval Notation: Domain = $[0, 3) \cup (3, \infty)$

Range of f = All possible values of $f(x)$ for x in domain

Example : $f(x) = x^2$ has range $[0, \infty)$.
all positive real numbers

f even $\Rightarrow f(-x) = f(x)$ for all x in domain

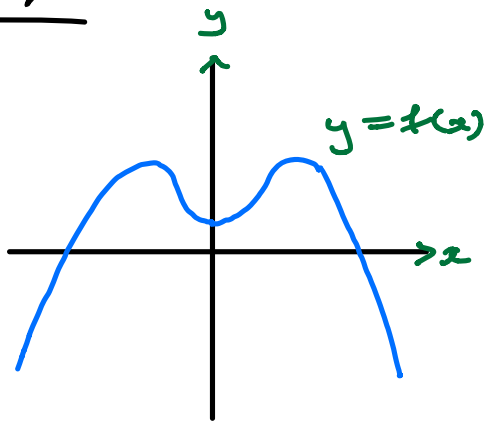
f odd $\Rightarrow f(-x) = -f(x)$ for all x in domain

Examples : $f(x) = x^2$ even, $f(x) = x^3$ odd

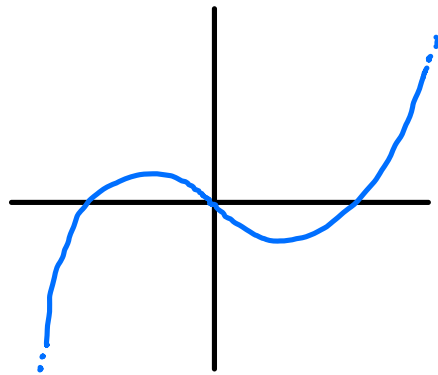
f even \Rightarrow Graph $y = f(x)$ is same after reflecting in y-axis

f odd \Rightarrow Graph $y = f(x)$ is same after rotating by 180° around $(0,0)$.

Examples



f even



f odd