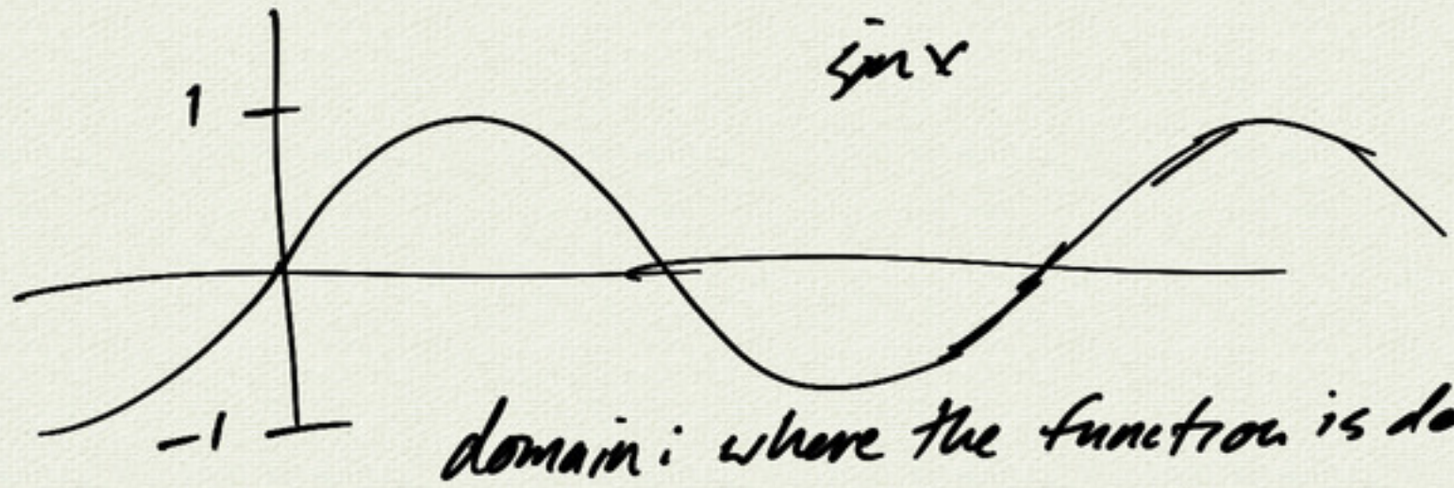
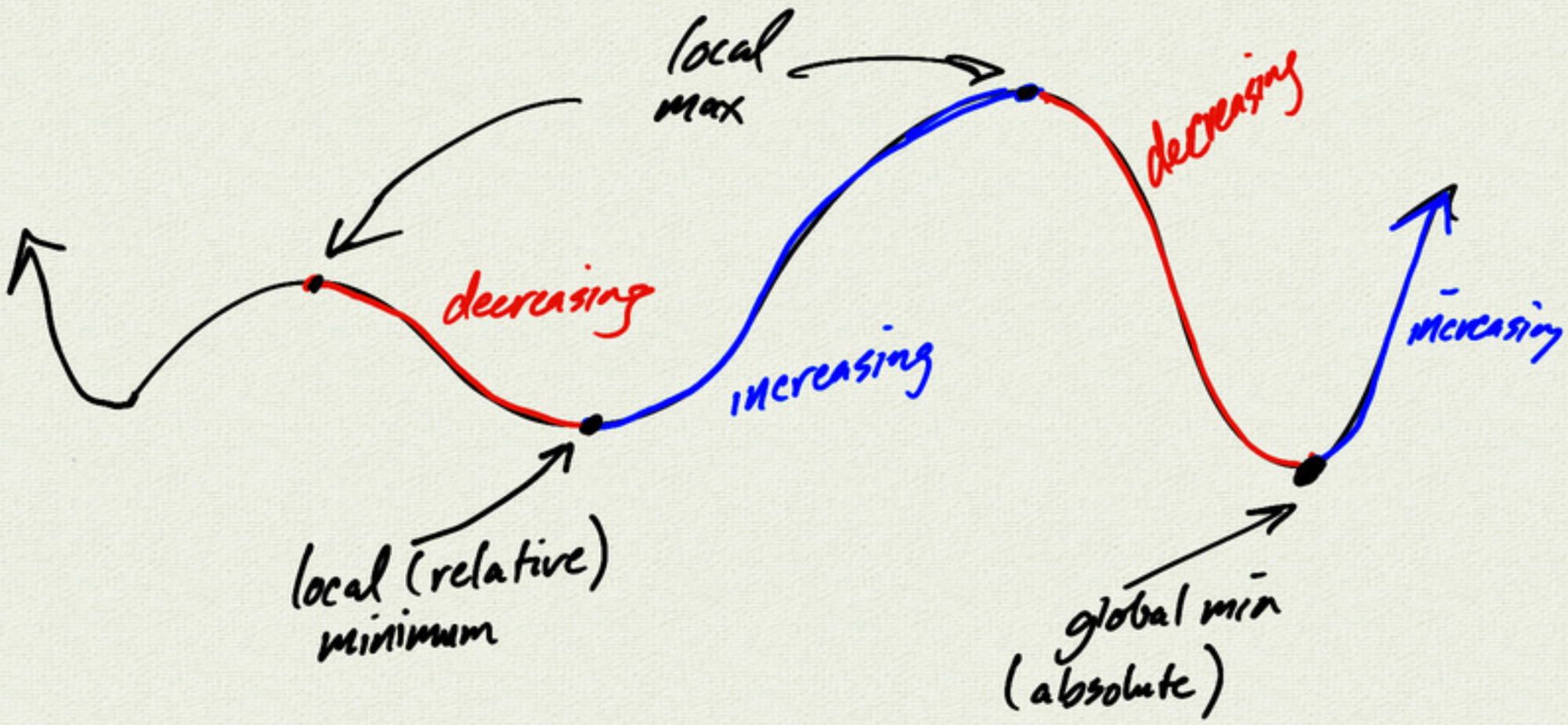
4.1 Function Properties

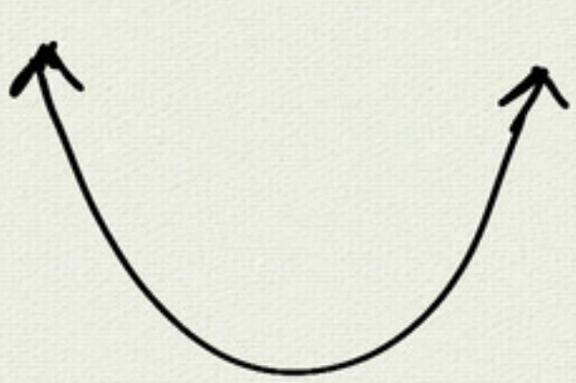
domain/range



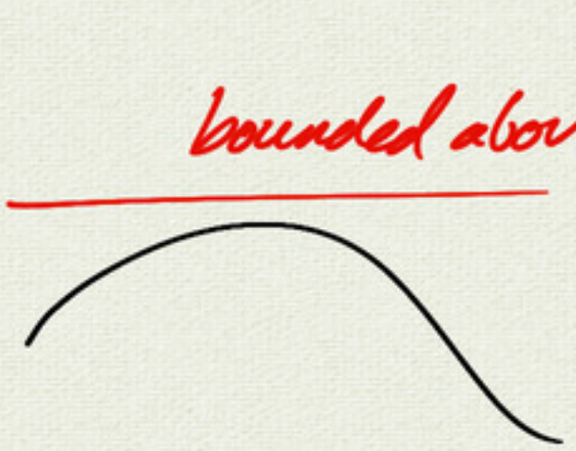
domain: where the function is defined

range: the set of all possible function values

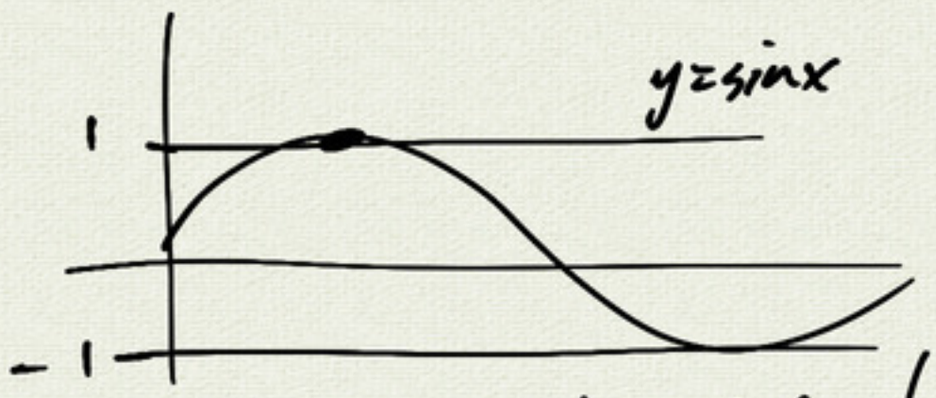




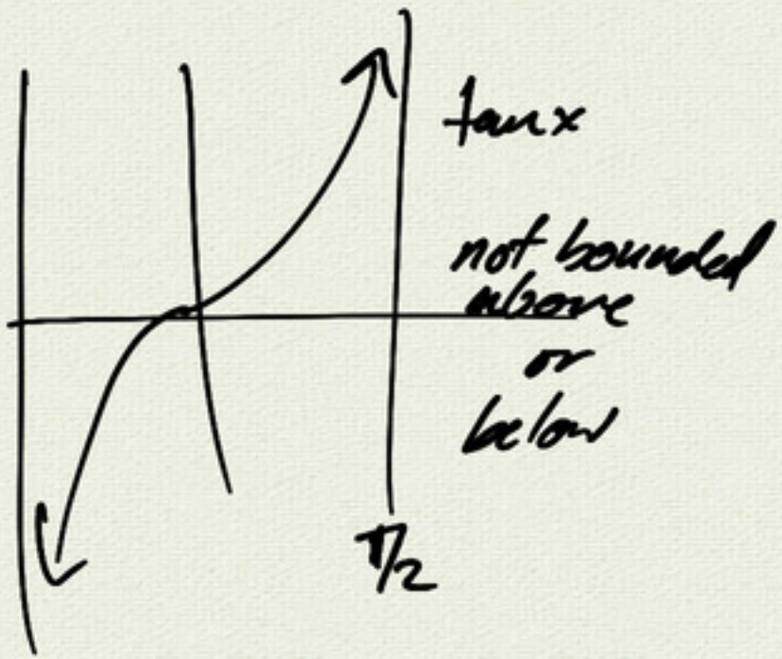
bounded below



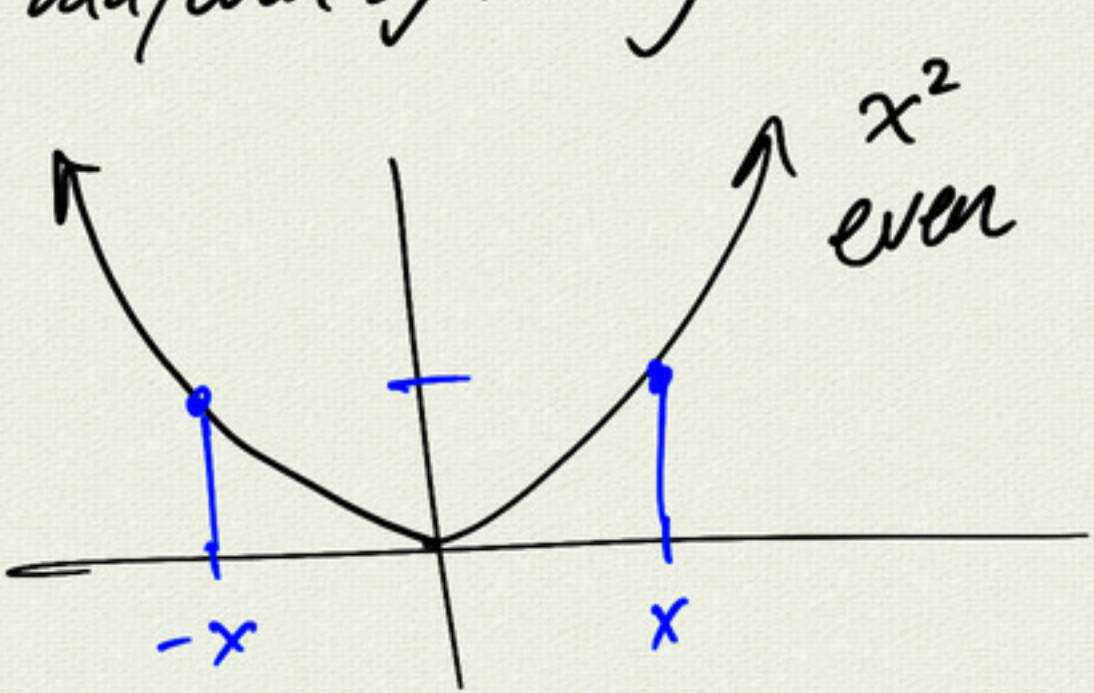
bounded above



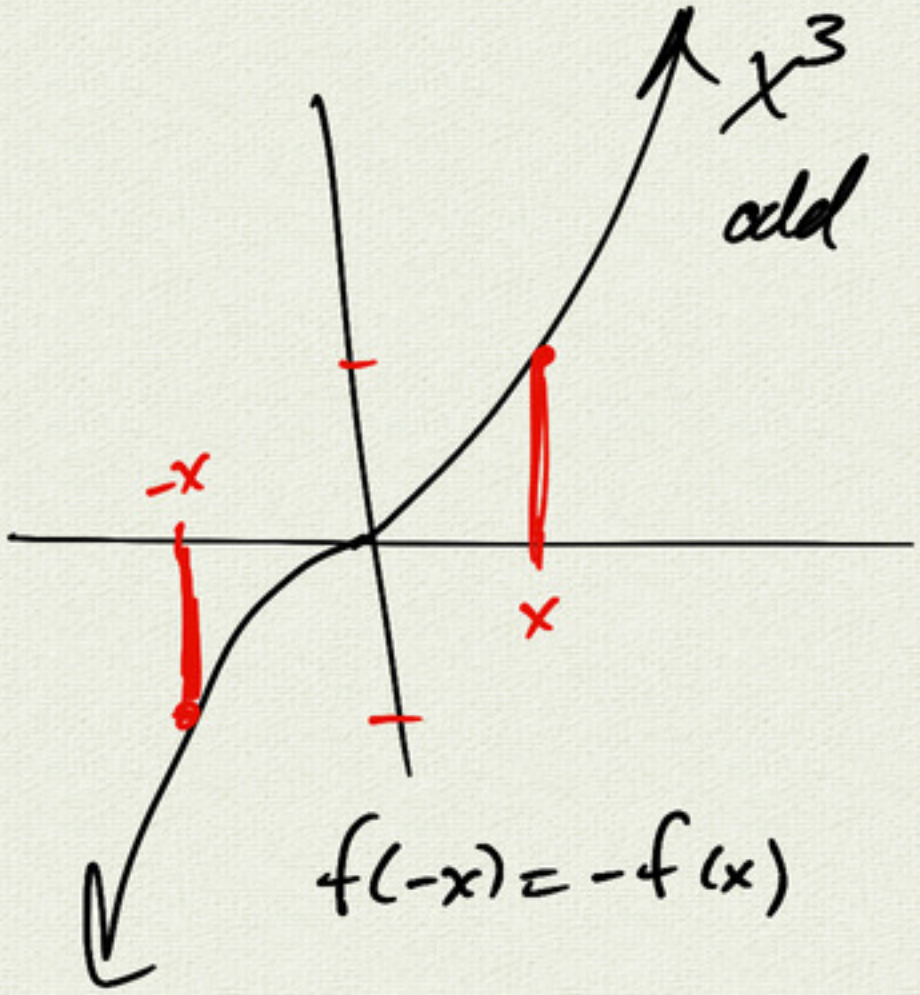
bounded (both above and below)



odd/even symmetry



$f(-x) = f(x)$



$f(-x) = -f(x)$

discontinuities

continuous

draw without taking pen off paper

$f(x) = \tan x$

$$\lim_{x \to \frac{\pi}{2}^-} f(x) = \infty$$

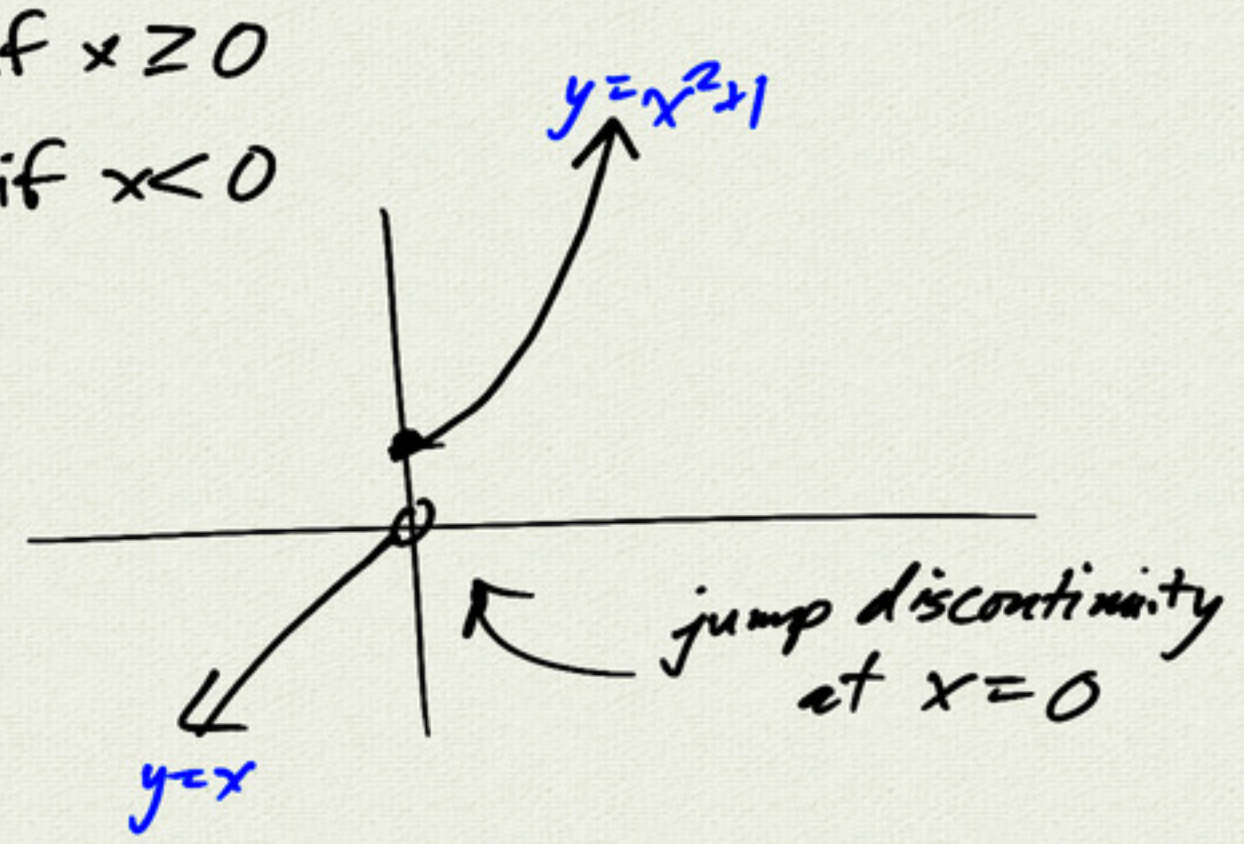
$$\lim_{x \to \frac{\pi}{2}^+} f(x) = -\infty$$

could also write:

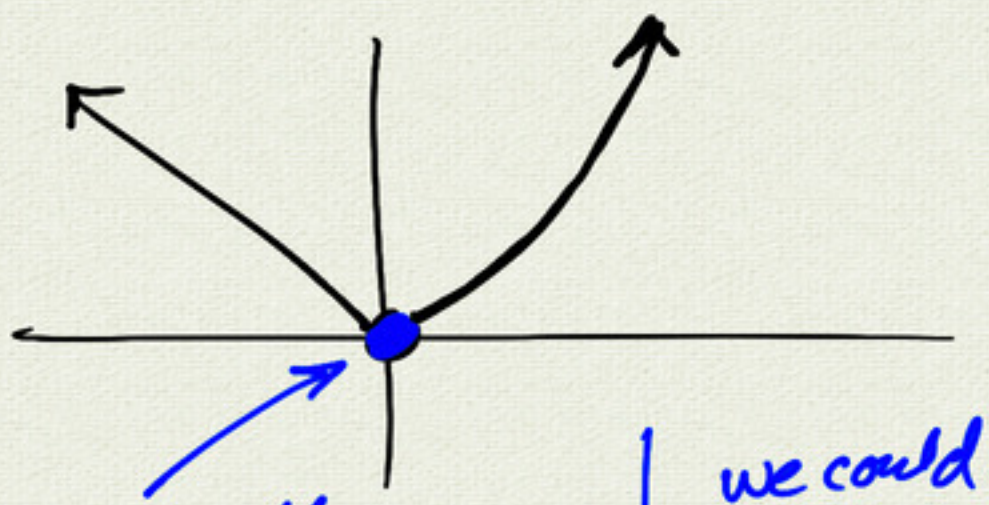
$$\lim_{x \to \frac{\pi}{2}^-} \tan(x) = \infty$$

$$\lim_{x \to \frac{\pi}{2}^+} \tan(x) = -\infty$$

$$f(x) = \begin{cases} x^2+1 & \text{if } x \geq 0 \\ x & \text{if } x < 0 \end{cases}$$



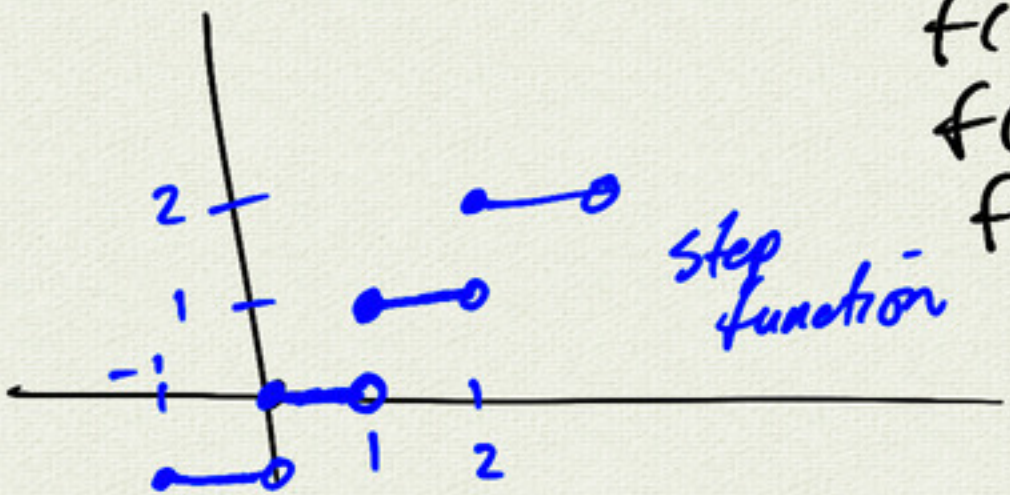
$$g(x) = \begin{cases} x^2 & \text{if } x > 0 \\ -x & \text{if } x < 0 \end{cases}$$



we could redefine $f(0) = 0$

$f(x) = \text{int}(x)$ (greatest integer function)

$(= \lfloor x \rfloor)$ "the biggest integer less than or equal to x"



$f(0) = 0$

$f(.1) = 0$

$f(.5) = 0$

$f(.9) = 0$

$f(1) = 1$

$f(1.1) = -2$

domain: $\mathbb{R}$

range: $\mathbb{Z}$

jump discontinuity at $x = k$ $(k \in \mathbb{Z})$