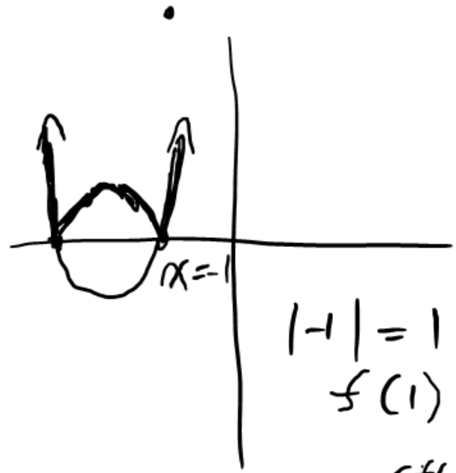



$|-1| = 1$
$f(1)$

If $x > 0$, $|x| = x$

if $x < 0$, $|x| = -x$

$|f(x)| = \begin{cases} f(x) & x \geq 0 \\ -f(x) & x < 0 \end{cases}$

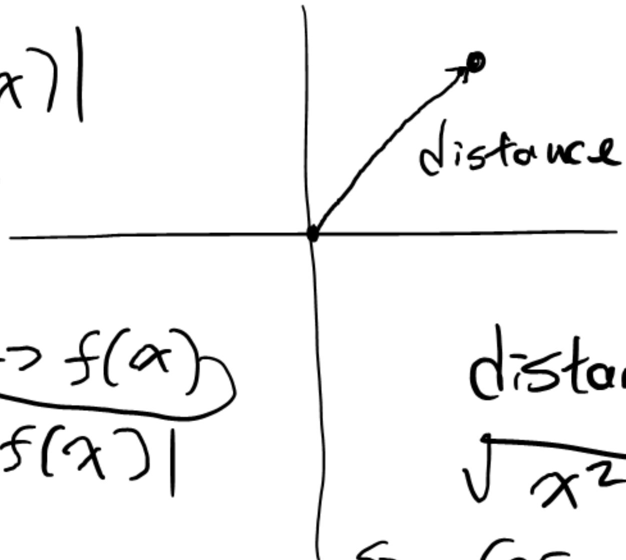
1 * $|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$

2 * $|x| = \sqrt{x^2}$

3 * $|x| = \max\{x, -x\}$

Complex

$(x, y)$




diff of

$f(|x|)$ vs $|f(x)|$

$x \to |x| \to f(x)$

$\to f(|x|)$

$x \to f(x)$

$\to |f(x)|$

distance =

$\sqrt{x^2 + y^2}$

so, for $|(x, y)|$

$= \sqrt{x^2 + y^2}$

$|(x, y, z, w, t)| =$

$\sqrt{x^2 + y^2 + z^2 + w^2 + t^2}$

Complex numbers does not mean complicated.

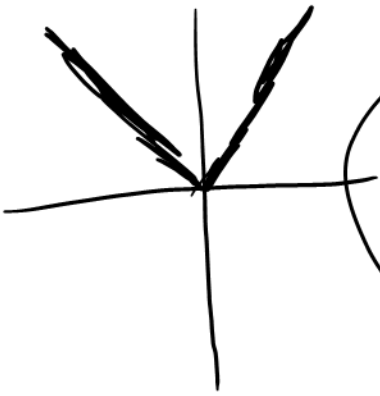
Complex is more like an "apartment complex"

Math in university:
Calculus, Linear Algebra

vectors

dimensions

$y = 2|x+3| - 7$ ② ① ③



$y = |x|$

$y = x$

$D = \mathbb{R}$

$R = [0, \infty]$

3 left

stretch 2

down 7

$D = \mathbb{R}$

$R = [-7, \infty]$

$I = (a, b)$, $f(x)$ is a function on $I$

Positive on an interval: (above $x$ axis)

$f(x) > 0$ for $x \in (a, b)$

Negative on an interval

"Non-negative" and "Non-positive"

$\geq 0$ $\leq 0$

$f(x)$ is nonnegative on $[-2, 2]$

negative on int.

Increasing function: for $x_1 < x_2$, $f(x_1) < f(x_2)$

As inputs move, outputs increase

Same for decreasing

local maximum: $f(x)$ has a local max at c

Local maximum: f(x) has a local maximum at x=c, if f(c) >= f(x) for all x "near" c

every point on a horizontal line is a local maximum and min

End behaviour: refers to what happens to the functior for extremely large positive and negative values of x

eg as x goes to + inf or x goes to - inf

# Inequalities

eg. $-1 \le \frac{3-5x}{4} \le 3$ solve for $x$

✓ Positive quantities

Negative quantities

$x > y$

$\frac{1}{x} > \frac{1}{y}$

$\boxed{\frac{x}{x-2} > \frac{1}{x-2}}$

multiple cases

case 1: $x-2>0$

$x>1, x>2$

case 2: $x-2<0$

$x<0, x<2$

$x>2$ or $x<0$

$-4 \le 3-5x \le 12$

$-12 \le 5x-3 \le 4$

$-9 \le 5x \le 7$

$-\frac{9}{5} \le x \le \frac{7}{5}$

$\therefore x \in \left[-\frac{9}{5}, \frac{7}{5}\right]$

$$f(x) = a_n \prod_{k=1}^{n} (x - r_k)$$

$\prod$ – "pi" = product

product notation

eg. $f(x) = 3(x-2)^2(x+3)^2$

The roots of $f(x)$ are 2 and $-3$

we say 2 is a root of order 2

and $(-3)$ order 3

The order is the degree of term $(x-r)$ written in factored form

$f(2)=0$

Cancel $x-2$

$3(x-2)(x+3)^3$ 2 is still a zero

repeat