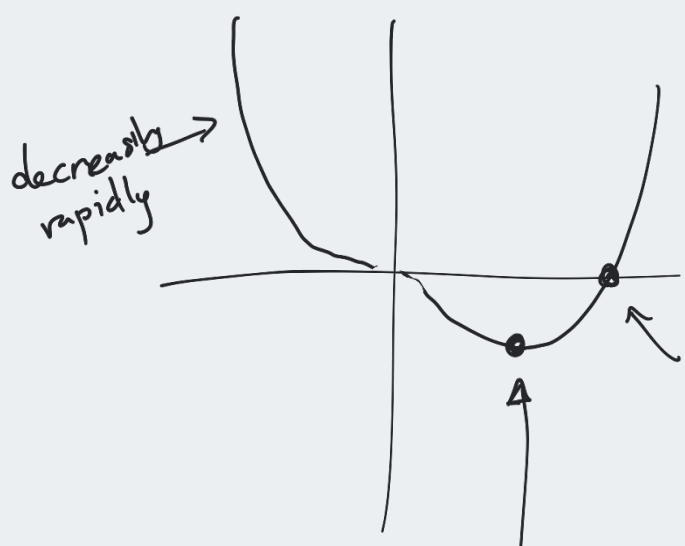
Calculus I

Calc is about change

Like $f(x) = 3x^4 - 2x$

can you tell me how it changes?



where is this point? (pre-calc)

Calc: where is it increasing/decreasing?

where is this point?

where are the min/max y-values?

Functions

Usually in class, we have a formula

$$f(x) = \sim\sim$$

each x-value is part of the domain

the set of answers is the range.

For $f(x) = x^2$

$$f(3) = 3^2 = 9$$

$$f(-2) = (-2)^2 = 4$$

The domain here is all real numbers

written: $\mathbb{R}$

or $(-\infty, \infty)$

$3x^2 - 3x + 7$

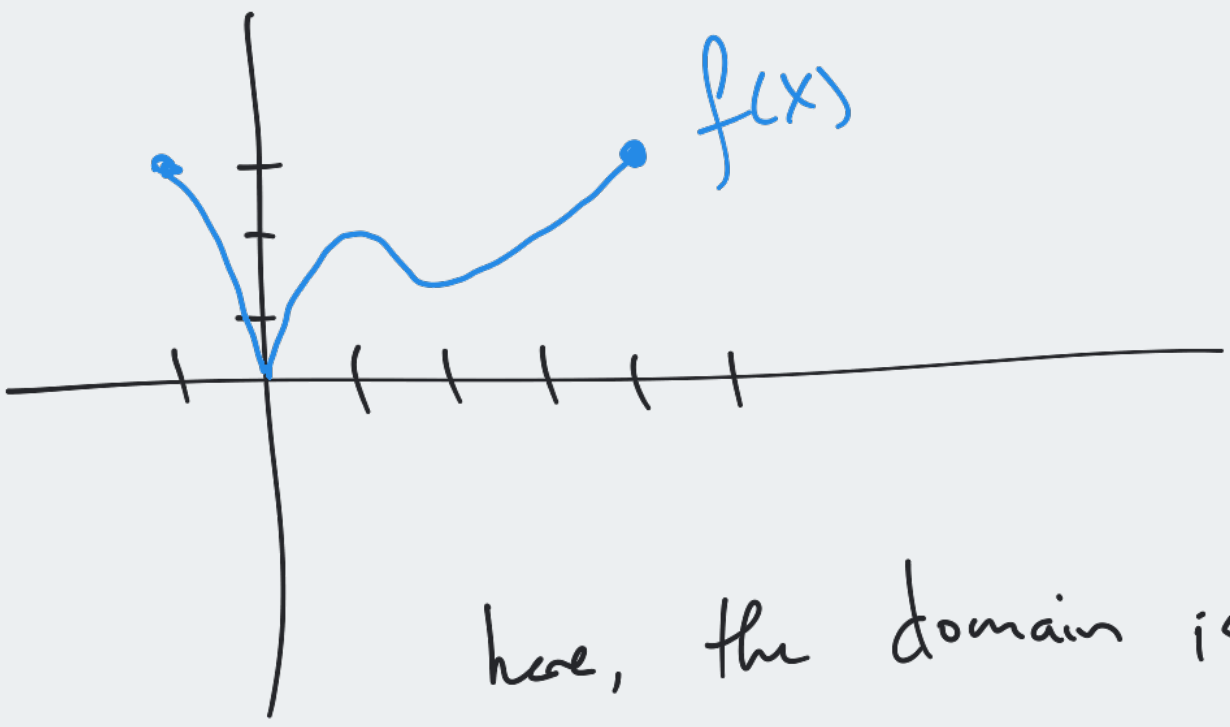
range can be hard.

The range here is $[0, \infty)$

or $0 \leq x$

or $x \geq 0$

Sometimes it's just a graph



here, the domain is: $[-1, 4]$

the range is: $[0, 3]$

---

sometimes we just get words or data values.

A function is <u>any</u> rule, description.
of how to get $f(x)$ if we know x.

In "real world" calc,
we often just have data.

Usually with a formula, we can find the domain:

$f(x) = \frac{1}{x+4}$ denom can't be zero.

$x+4 = 0$

$x = -4$ ← this is not allowed.

domain is all $\mathbb{R}$ except -4.

$f(x) = \sqrt{2x+3}$ (inside must be positive or zero.)

$2x+3 \geq 0$

$2x \geq -3$

$x \geq -3/2$

domain is $[-3/2, \infty)$