Last Time: Inverse Functions, Logarithms

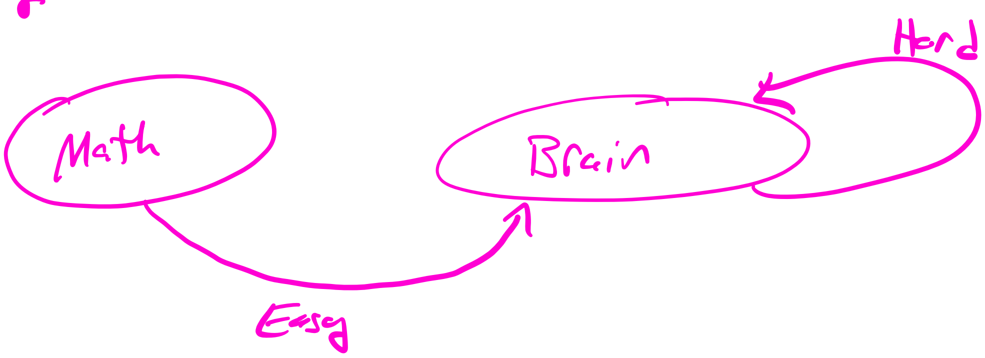
Today: Syllabus
Velocity & Tangent Lines
The Limit of a function

Future: Th - Class
F - HW00
HW01
Quest 00
Quest 01
all Due

Note: Make sure you upload correctly

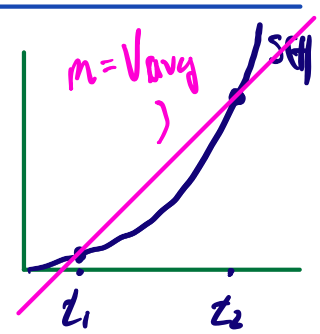
T - Quest 02
W - HW02

Learning Math:

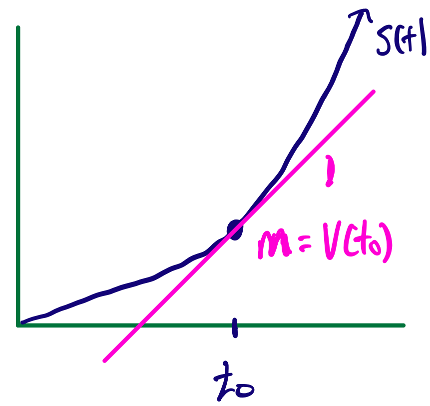


Cell phones - Do not Disturb & put away.

Average velocity: $V_{[t_1,t_2]} = \dfrac{s(t_2)-s(t_1)}{t_2-t_1} = \dfrac{\Delta s(t)}{\Delta t}$.



Instantaneous velocity: $V(t_0) = \dfrac{S(t_0)-S(t_0)}{t_0-t_0} = \cancel{\dfrac{0}{0}}$



How do I find $V(t_0)$ exactly from an equation + not a graph?

$\iff$ How do I find the slope of a tangent line?

Idea: Find $V_{[t_0,t]}$ for values of t super close to t_0. In fact, infinitely close to t_0.

$$1+2+4+8+16+32+64+\cdots = A$$

$$1+2+4+8+16+32+64+128+\cdots = 2A+1 = A$$

$$\therefore\ 1 = -A$$

$$A = -1$$

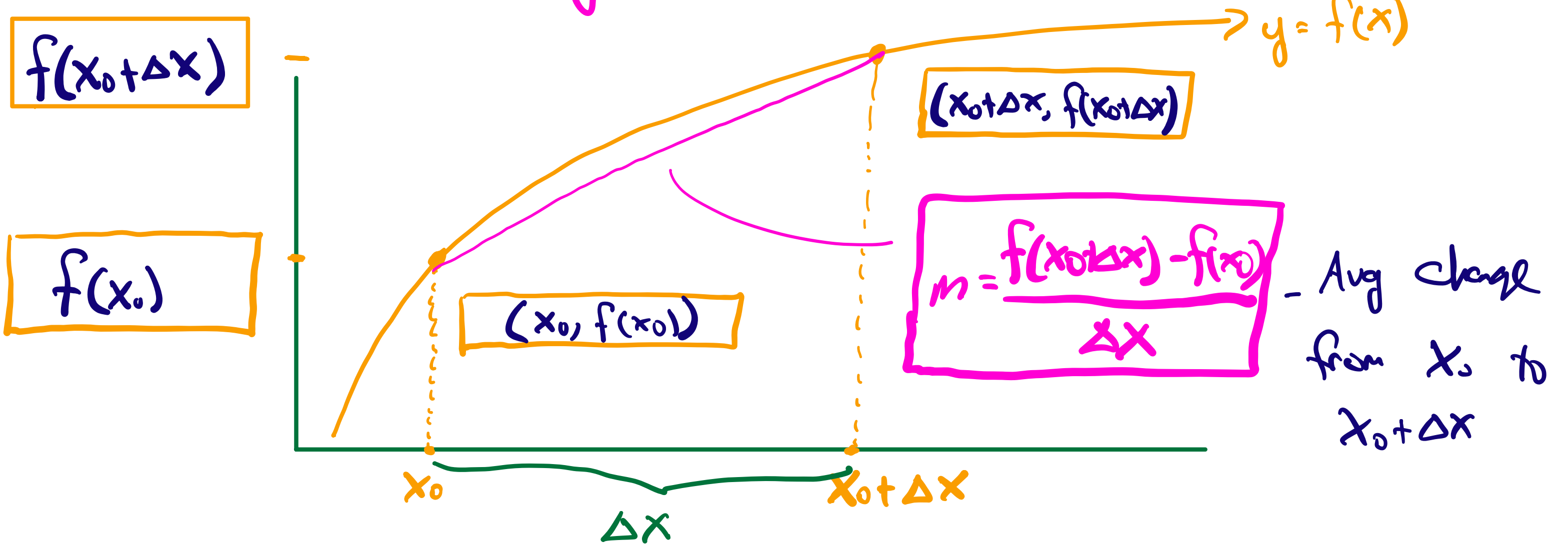
$$\boxed{1+2+4+8+\cdots = -1}$$

Infinity is a disaster unless we are super careful.

Where we are: The thing I want looks like $\frac{0}{0}$.

So I need to know what $\dfrac{S(t)-S(t_0)}{t-t_0}$ looks like when t is close to t_0. This leads us to **Limits**

Here is another way to set up v(t)



Find m when $\Delta x = 0 \Rightarrow \frac{f(x_0+0)-f(x_0)}{0} = \frac{0}{0}$

The limit of f(x) as x approaches a,

$$\lim_{x\to a} f(x),$$

is a number L which f(x) gets infinitely close to as x gets infinitely close to a.