

# CUMC 2023: Learning the Math Language

## Gaining Intuition Behind Analysis

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# Outline

- Why Language?

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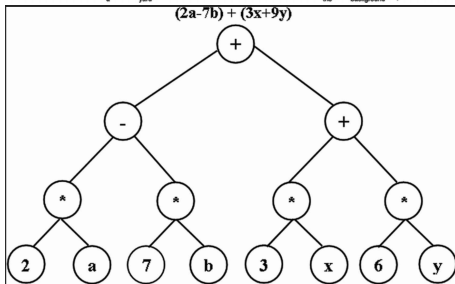
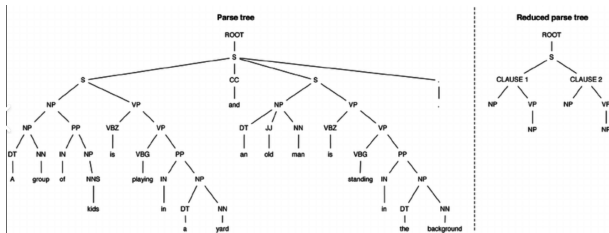
- Why Language?
- Words and Emotions
- Conversations and Information
- Is It Good?

# Outline

- Why Language?
- Words and Emotions
- Conversations and Information
- Is It Good?
- Future Work

# {Natural, Programming, Math} Language

- Formalism (Syntax)



# {Natural, Programming, Math} Language

- Formalism (Syntax)
- Logic



# {Natural, Programming, Math} Language

- Formalism (Syntax)
- Logic
- Psychologism

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- "Good" proper nouns  $\mathbb{N} = \{1, 2, 3, \dots\}$

# Conversations

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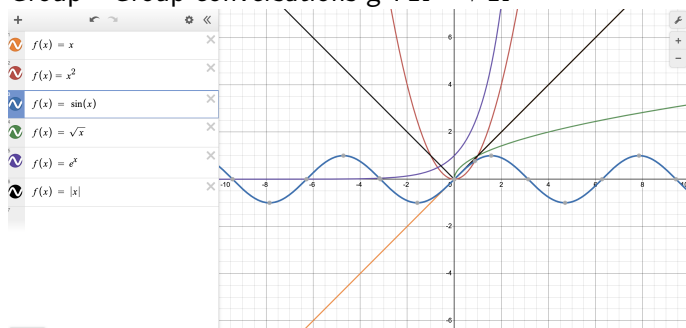


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- Composition

# Limits and Continuity

- Emotional Distances (Metric)

# Limits and Continuity

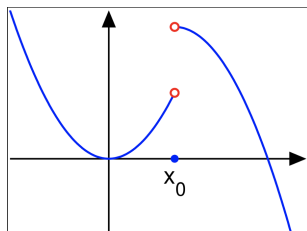
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- Uniform Continuity

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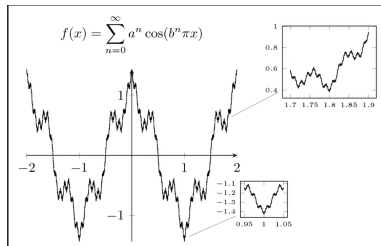
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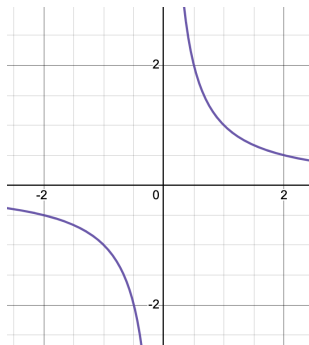
# Differentiability

- Increasing/Decreasing, Convex/Concave
- Critical Points
- Mean Value Theorem:  $f'(x) = \frac{f(b)-f(a)}{b-a}$
- Differentiable  $\Rightarrow$  Continuous



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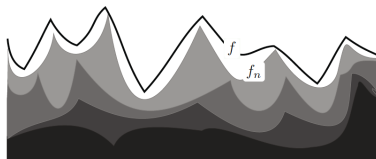
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- Convergence / Improper Integrals

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- Highly Immature
- Infinity is not intuitive enough.
- Difficult to incorporate Topology
- Hard for computational results and theorems.

# Future of This Project

- Supplement to other analysis materials?
- Write something?
- [xiaohoward.github.io/web](https://xiaohoward.github.io/web)

