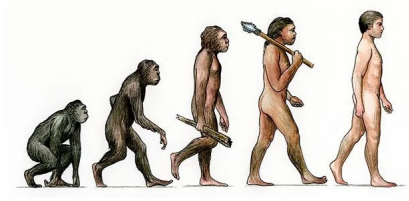
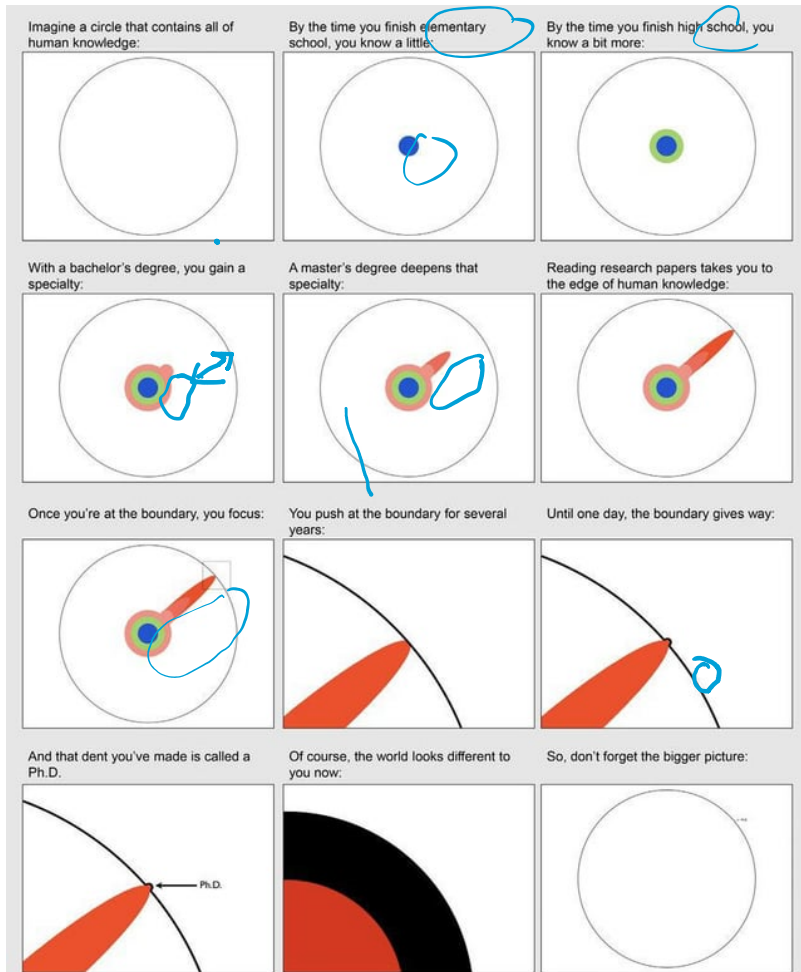



Real Analysis in Stat 641 (Iowa State)

Wednesday, June 26, 2024 3:06 PM

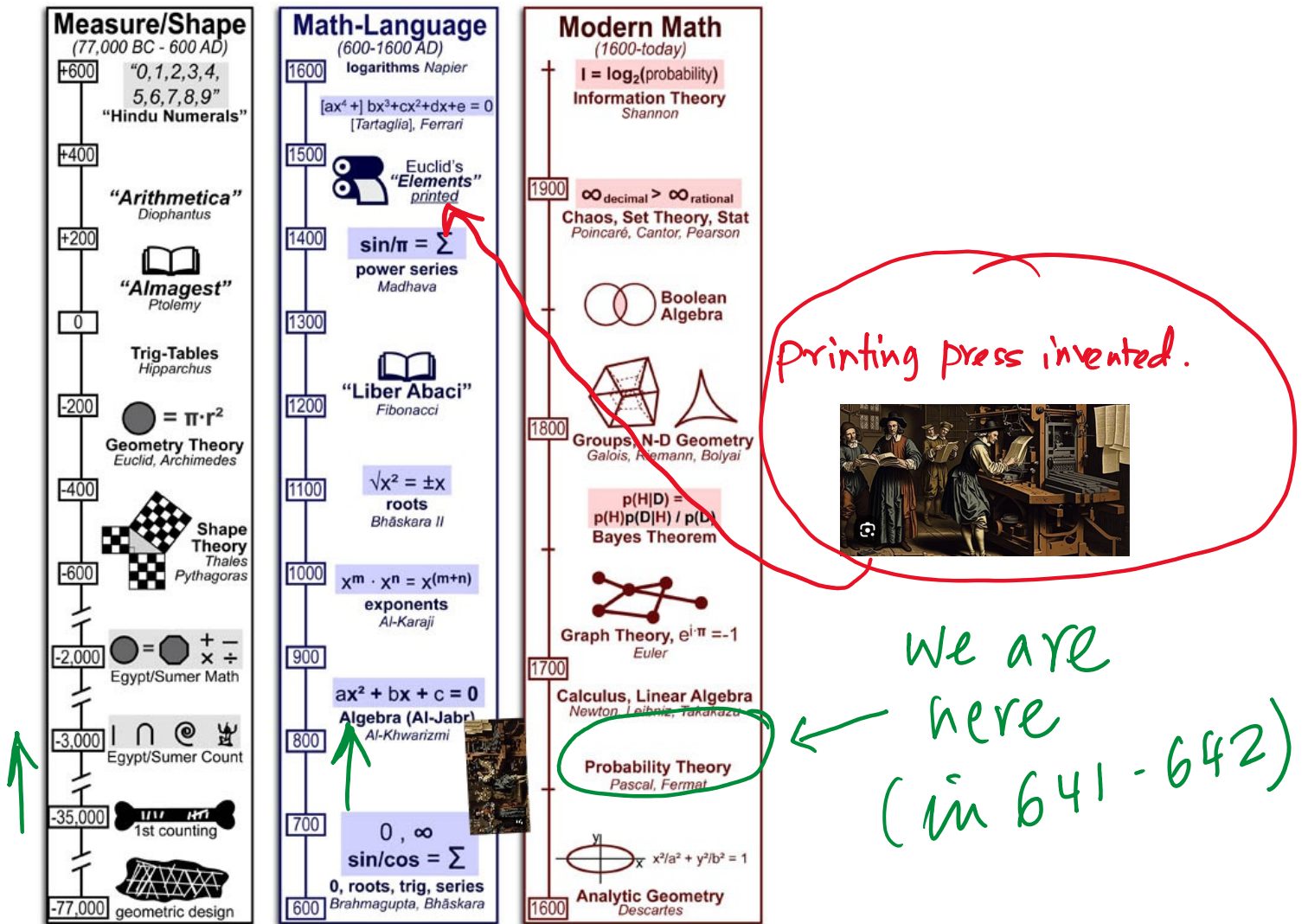


More than just a catchy phrase, “ontogeny recapitulates phylogeny” is the foundation of recapitulation theory. Recapitulation theory posits that the development of individual organisms (ontogeny) follows (recapitulates) the same phases of the evolution of larger ancestral groups of related organisms (phylogeny). Feb 10, 2017

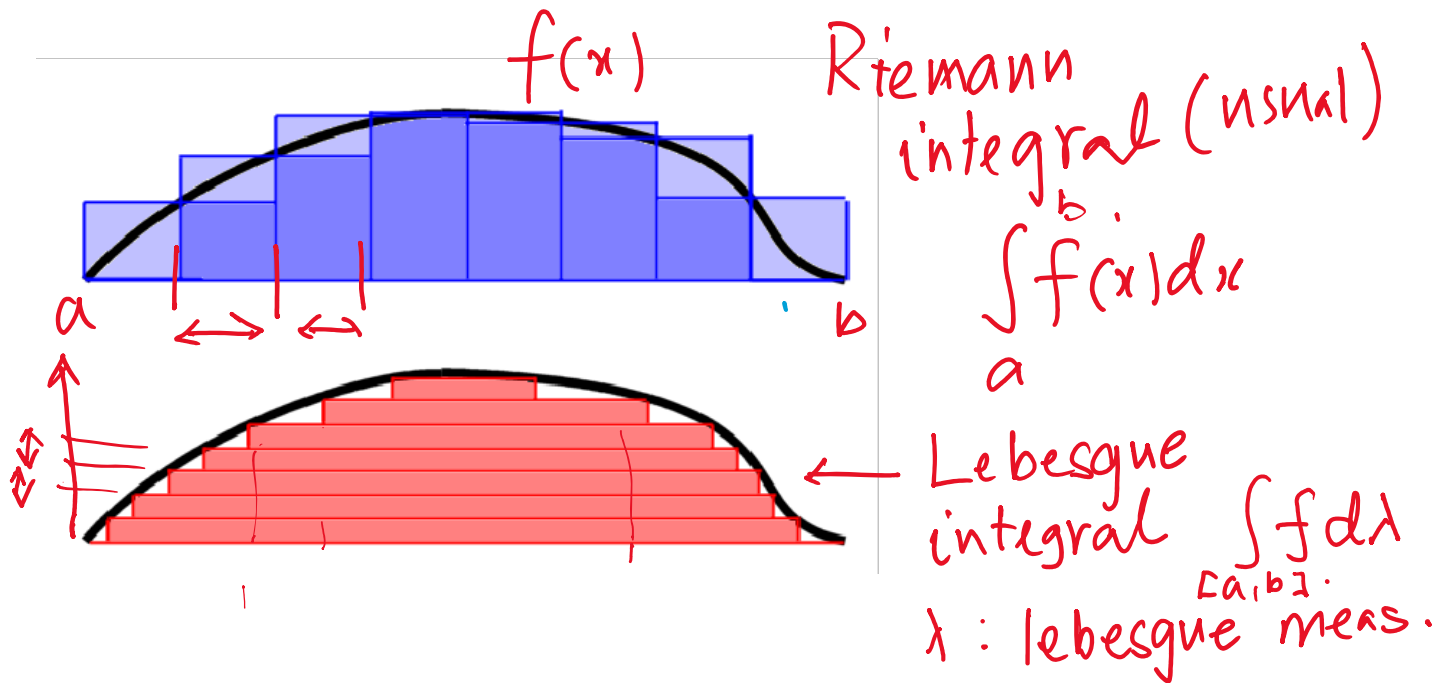
 New York Botanical Garden
<https://www.nybg.org/blogs/science-talk/2017/02/>

A Catchy Phrase, But is It True? - New York Botanical Garden

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Last: With measure Theory, we will understand these statements more clearly. $(\Omega, \mathcal{F}, \mathbb{P})$ $(\mathbb{R}, \mathcal{B}(\mathbb{R}))$

Theorem 5.5.9 (Strong Law of Large Numbers) Let X_1, X_2, \dots be iid random variables with $\mathbb{E}X_i = \mu$ and $\text{Var } X_i = \sigma^2 < \infty$, and define $X_n = (1/n) \sum_{i=1}^n X_i$. Then, for every $\epsilon > 0$,

$$\mathbb{P}(\lim_{n \rightarrow \infty} |\bar{X}_n - \mu| < \epsilon) = 1 \iff \mathbb{P}(\lim_{n \rightarrow \infty} |\bar{X}_n - \mu| = 0) = 1$$

or $X_n - \mu \rightarrow 0$ a.e. (\mathbb{P})

that is, \bar{X}_n converges almost surely to μ .

Usual text for 641

<https://www.amazon.com/Measure-Theory-Probability-Springer-Statistics/dp/038732903X>

Classic reference for analysis (advanced calculus):

<https://www.google.com/search?client=opera&q=analysis+rudin&sourceid=opera&ie=UTF-8&oe=UTF-8>