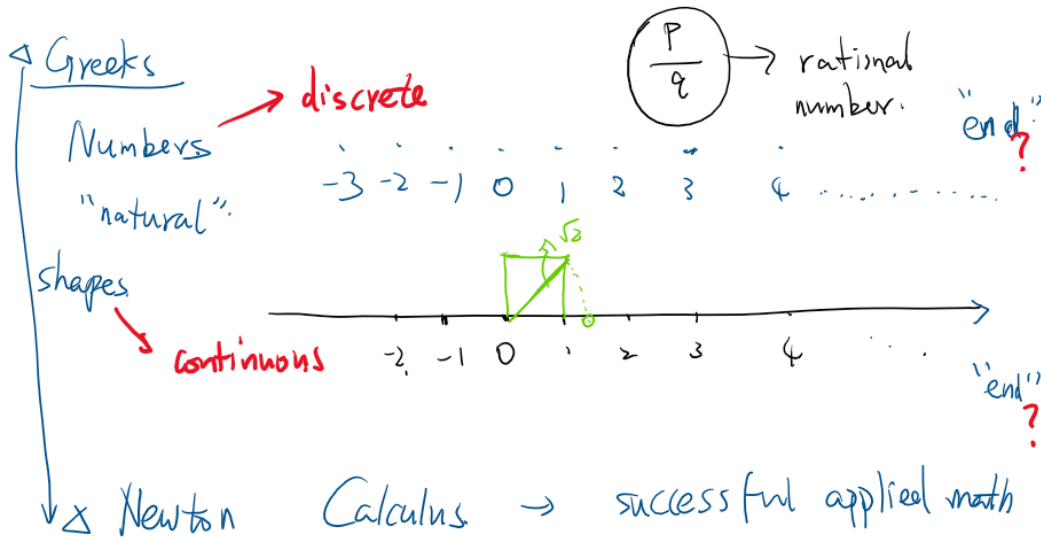


What is set theory

Why we have that?

inadequate foundation of math.



$$\begin{aligned}
 (x^3)' &= \frac{(x+\Delta)^3 - x^3}{\Delta} \\
 \Delta \neq 0 &= \frac{\cancel{x^3} + 3x^2\Delta + 3x\Delta^2 + \Delta^3 - \cancel{x^3}}{\Delta} \\
 &= 3x^2 + 3x\Delta + \Delta^2 \\
 \Delta = 0 &= 3x^2
 \end{aligned}$$

1900's \triangle

Analysis

"topology"

Henri Poincaré

integers \mathbb{Z} \longleftrightarrow "1-1 correspondence" $2\mathbb{Z}$ even numbers

$a \longmapsto 2a$
 \longleftarrow

"Hilbert's hotel"

"Russell's paradox"

1901 \triangle

Cantor

"axioms for math"

\downarrow
"Z-F-C" systems

\aleph_0
 \downarrow
first \aleph_0
 \downarrow
 $|\mathbb{Z}|$

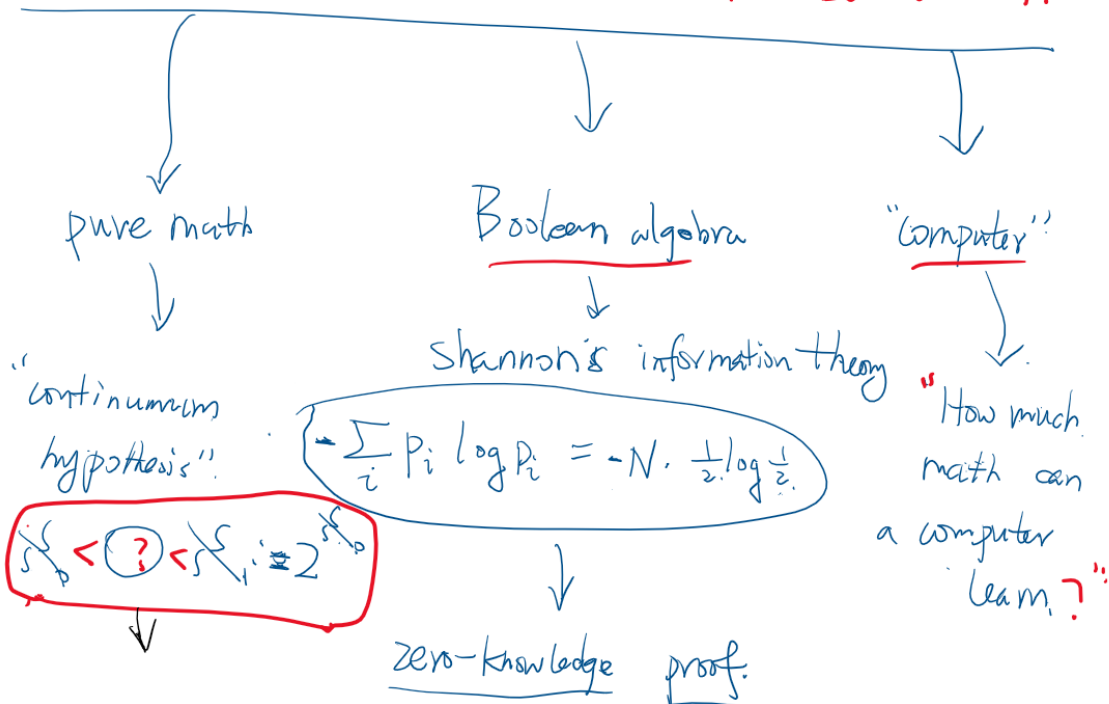
$< 2^{\aleph_0}$
 \downarrow
"second" \aleph_0
 $|\mathbb{R}|$

$\dots \downarrow$
1910's
Hilbert

1920's Δ
1930's

Gödel, Von Neumann,

Incomplete Theorem: there's no
complete axiom system,
s.t. every math statement
can be told to be T or F.



1962 Paul Cohen