Mathematical Lies and the Lying Liars who Teach Them

— or —

The Peano Postulates have been Drinking, Not Me

We Lie to Students

Precalculus: A Good Time to Stop Lying

Key Ideas

- Closure
- Identity elements
- Inverse elements

Back to the Beginning: Counting

Peano Postulates

1. $0 \in \mathbb{N}$
2. $n \in \mathbb{N} \Rightarrow n + 1 \in \mathbb{N}$

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Peano Postulates

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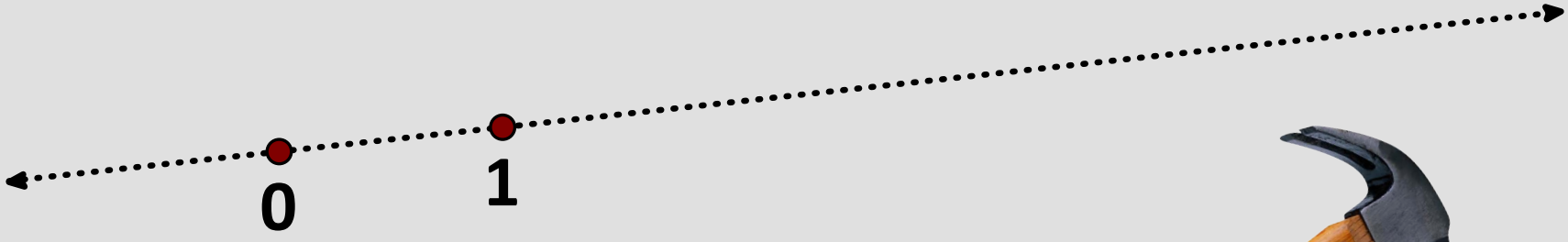
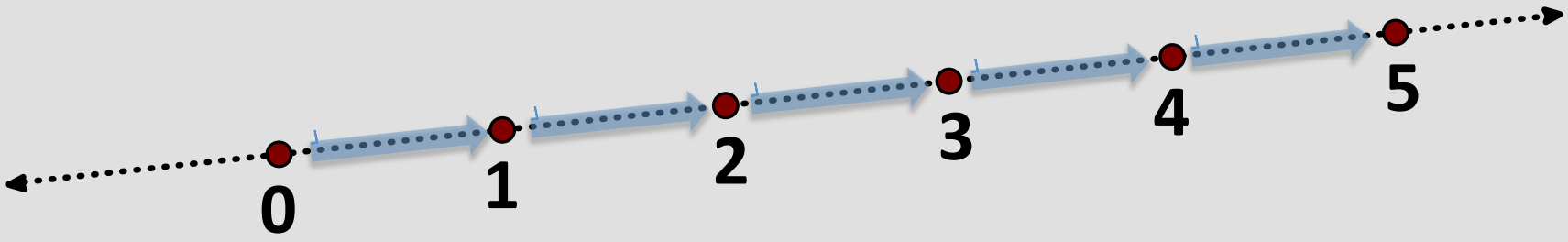
2. $n \in \mathbb{N} \Rightarrow n + 1 \in \mathbb{N}$
3. $n + 1 = 0 \Rightarrow n \notin \mathbb{N}$
4. $n + 1 = m + 1 \Rightarrow n = m$
5. $0 \in S$ and $\forall n \in S, n + 1 \in S$
   $\Rightarrow S = \mathbb{N}$

Geometric Construction



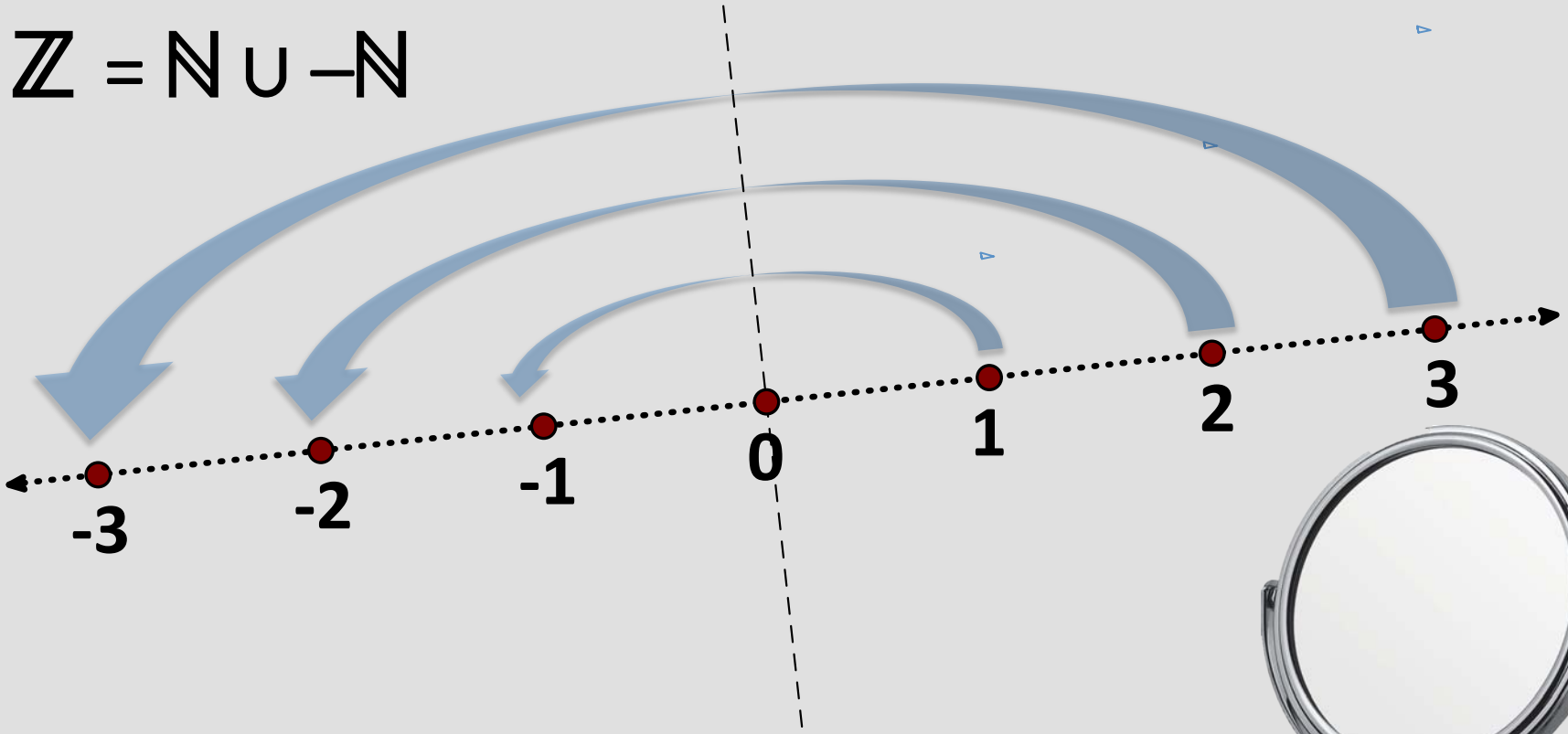
Geometric Construction



The Natural Numbers $\mathbb{N}$

Natural Numbers and their Opposites

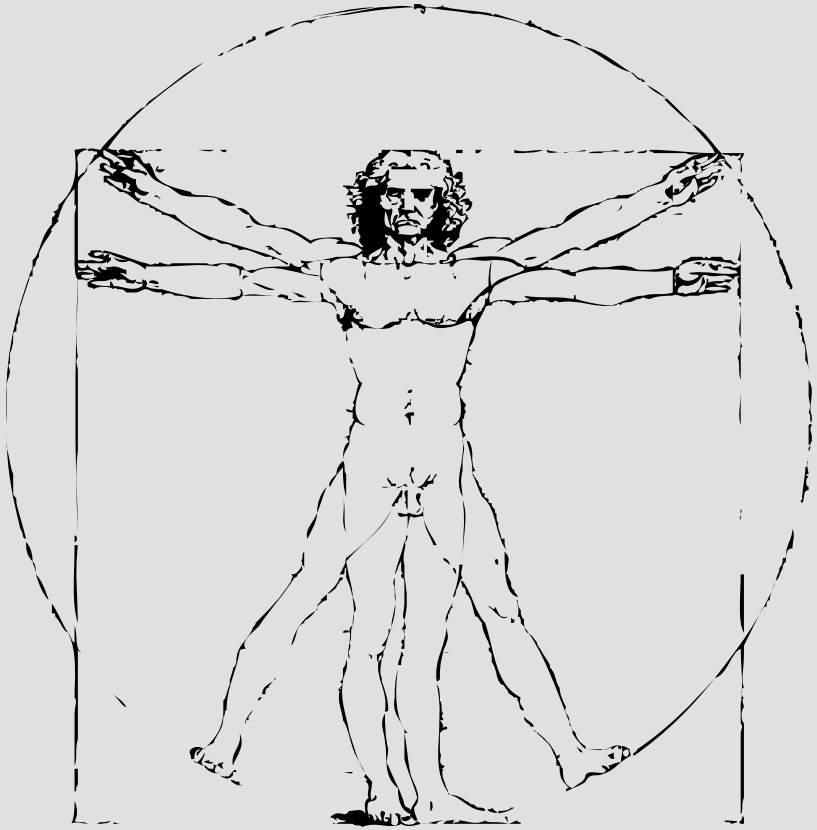
$\mathbb{Z} = \mathbb{N} \cup -\mathbb{N}$



The Integers $\mathbb{Z}$

Ratios of Integers

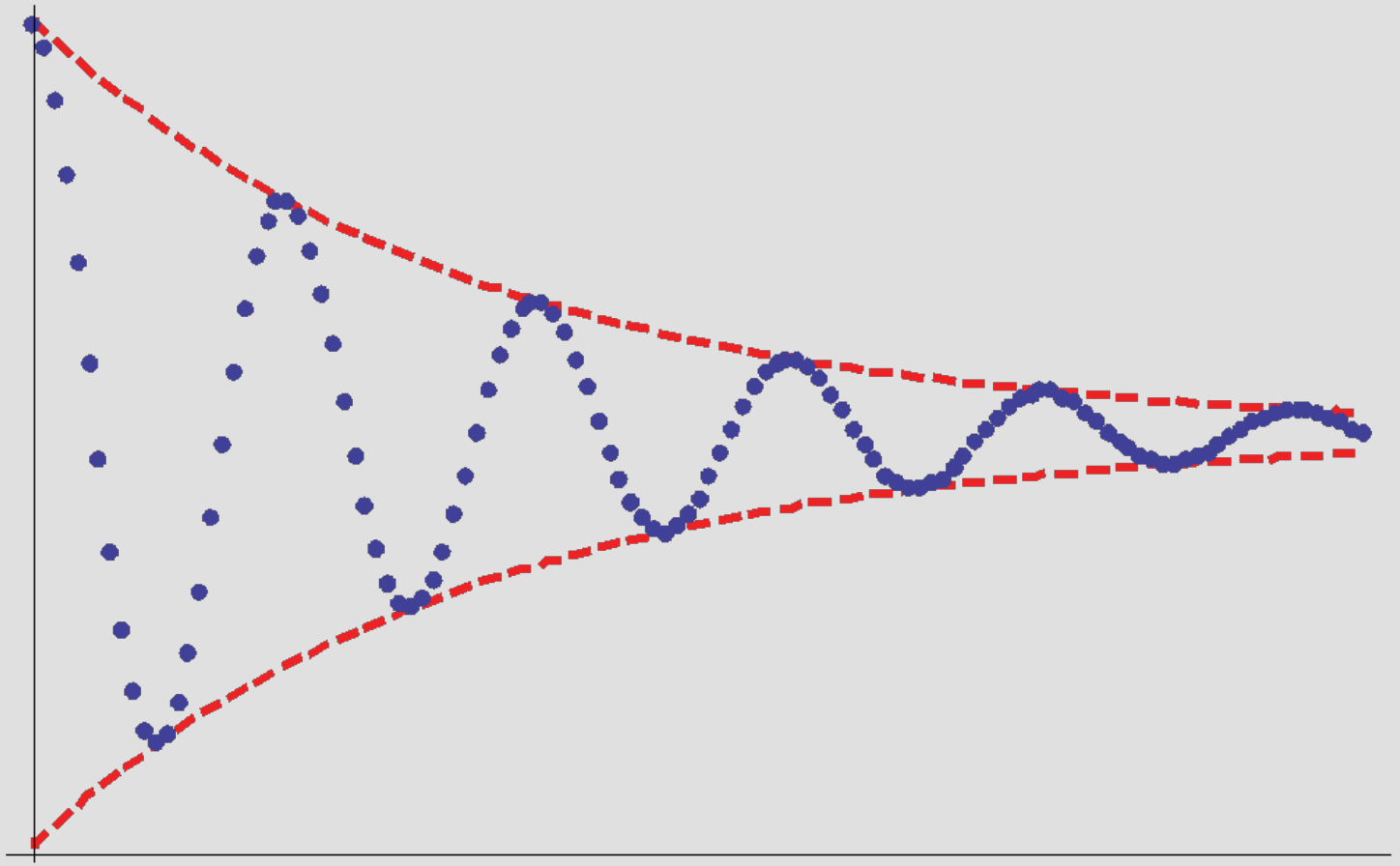
$\mathbb{Q} = \{ {}^{a}/_{b}$ with $a,b \in \mathbb{Z}$ and $b \neq 0\}$



The Rational Numbers

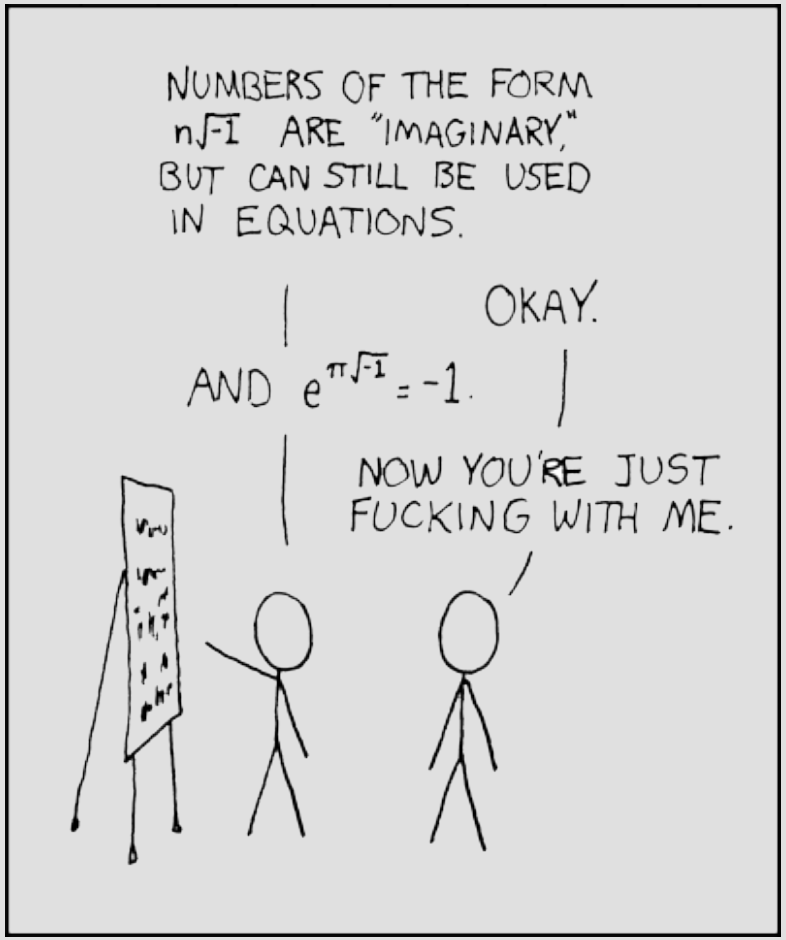
$\mathbb{Q}$

Sequences of Rational Numbers



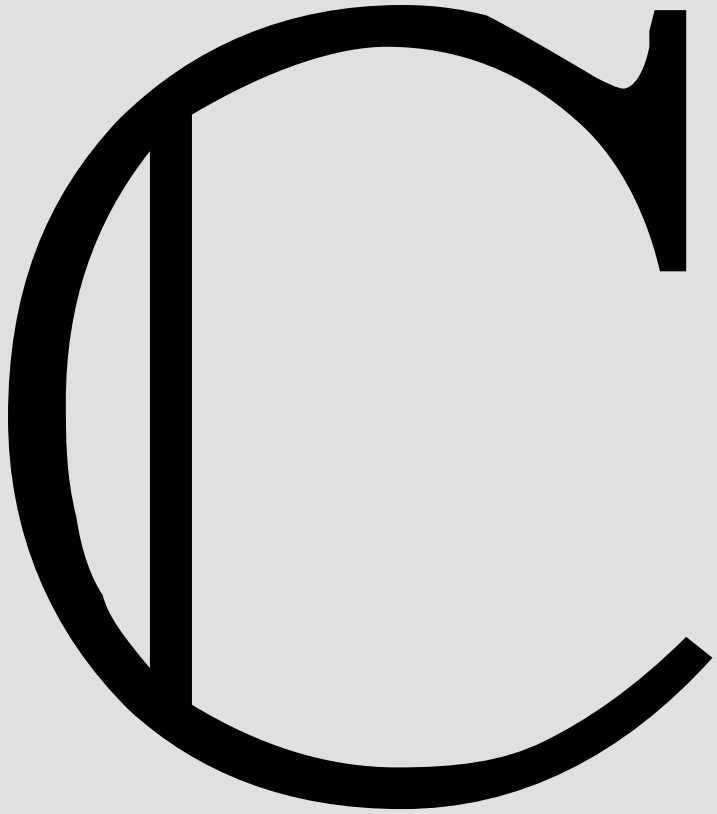
The Real Numbers

Square Roots of Negative Numbers



Comic by Xkcd, http://xkcd.com/179/

The Complex Numbers



We're Still Lying

Time's Up!

- Apologies to Al Franken and Tom Waits for the titles.
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