- · Discussion Results: what is a number?
 - Something about group theory
 - * This is more like a way of telling us how to use numbers, not really a good definition.
 - * Set up bounds to define things
 - Different classes (natural, real, imaginary)
 - Where do you draw the boundaries between objects?
 - A way to quantify the nature of living and reality
- Number Systems
 - We want them to be desirable and group-like
 - Types

* Natural Numbers

- · Integers greater than zero
- * Whole Numbers
 - · Natural Numbers + 0
 - · 0 is the hole.
- * Integers
 - $\{\ldots, -2, -1, 0, 1, 2, \ldots\}$
 - · Good for algebra, we'll see later
- * Rationals
 - · Like $\frac{1}{2}$.
 - · A ratio/fraction/quotient of integers
- * Real
 - · Like π
 - · A number on the number line
 - · A number that can be a distance to something.
 - · A good enough definition that isn't "real analysis"

* Complex Numbers

- · Like 5i
- · There will be many complex numbers
- · Matrices with complex numbers can be different from real numbers
- · Complex plane
- * Hamaltonian numbers music video? #curiosity
- Why do we want more numbers?
 - * Why Zero?
 - · Additive identity
 - · Zero vector = identity vector
 - · Frame of reference, starting point, nice and neutral
 - * Zintegers?
 - Why negatives?
 - · So you can make zero

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- $\cdot\,$ Undo each other, undo a +5
- · Inverse
- $\cdot \ -a$ and a are additive *inverses*
- That's all we need to get to a group: KBe2020math530refGroups

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