## Source: KBe2020math530index

- · 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
      - { ..., -2, -1, 0, 1, 2, ... }
      - · Good for algebra, we'll see later
    - Rationals
      - Like  $\frac{1}{2}$ .
      - A ratio/fraction/quotient of integers
    - Real
      - Like  $\pi$
      - · 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
        - Undo each other, undo a +5
        - Inverse
          - -a and a are additive *inverses*
  - That's all we need to get to a group: [KBe2020math530refGroups]

Exr0n · 2020-2021 Page 1