NOTATION
- "\(e\)" : an element of.
  e.g. \(2 \in \mathbb{N}\) (2 is an element of the set \(\mathbb{N}\))
- "\(\notin\)" : not an element of
  e.g. \(12.5 \notin \mathbb{Z}\) (12.5 is not an element of the set \(\mathbb{Z}\))
- "\(\subseteq\)" : a subset of
  e.g. \(\mathbb{N} \subseteq \mathbb{Z}\) (\(\mathbb{N}\) is a subset of \(\mathbb{Z}\))
- "\(\subset\)" : not a subset of
  e.g. \(\mathbb{W} \nsubseteq \mathbb{N}\) (\(\mathbb{W}\) is not a subset of \(\mathbb{N}\))

RATIONAL NUMBER.
- TWO WAYS TO PROVE A NUMBER IS RATIONAL:
  1. make it a fraction of two integers
     e.g. \(0.\overline{7} = \frac{7}{10}\) \(\checkmark\)
     \(3.\overline{2} = \frac{32}{10}\) \(\checkmark\)
  2. the decimal repeats or terminates
     e.g. \(0.4\overline{141} \rightarrow \) repeats
     \(0.7 \rightarrow \) terminates

IRRATIONAL NUMBER (I) e.g. \(\pi \approx 3.14159265\)
Definition: the set of all decimal numbers that
neither repeat nor terminate.
  e.g. any roots that doesn't come out even.
REAL NUMBERS: set of all decimal numbers.

$$\mathbb{R} = \mathbb{Q} + \mathbb{I}$$

- rational
- real numbers
- irrational numbers.

(anything that shows on your scientific calculator)

FINITE SETS

- 3 ways to indicate infinite sets

  e.g. I. to say anything greater than 7

1. set builder notation (statement of inequality)

$$\{ x \mid x \in \mathbb{R}, x > 7 \}$$

"such that"

2. number line graph.

3. interval notation.

$$(7, \infty)$$

* Always use \([-\infty, \infty)\) parenthesis w/ infinity

e.g. II. to say anything between -3 and 2 including -3 but not including 2

$$\{ x \mid x \in \mathbb{R}, -3 \leq x < 2 \}$$

always go from smaller number to larger number when possible

- smaller number always on the left!