June 15, 2015

1.3 pg. 34-35

2, 4, 7, 9, 10, 13, 14, 18, 20, 29, 30, 37, 41, 46

* 2.1 pg. 48-49

1, 2, 4, 6, 9, 13, 16, 17, 23, 26, 28, 31, 36, 37, 39, 44, 45, 50, 58, 64

Jun 15-11:08 AM

Numerical Sets

Natural Numbers (Counting)

$\mathcal{N} = \{1, 2, 3, \ldots\}$

$n(\mathcal{N}) = \infty$

Whole Numbers

$\mathcal{W} = \{0, 1, 2, 3, \ldots\}$

Integers

$\mathcal{I} = \{\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots\}$

Rational Numbers (Fractions)

$\mathcal{Q} = \{x \mid x$ is the form of $\frac{a}{b}$ where $a$ & $b$ are integers and $b \neq 0\}$

($\frac{a}{b}$: fraction)

$\frac{1}{7}, \frac{7}{19}, \frac{23}{2}, \frac{5}{1}, -\frac{13}{6}$

$0.0675$

$3\overline{)4} = \frac{4}{3}$

$2 : 1$

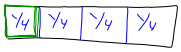
Jun 15-11:12 AM

$\frac{a}{b}$ where $b \neq 0$

$\frac{5}{0}$ is Undefined!

A fraction is always of some whole.

$\frac{1}{4}$ of a whole $\frac{4}{4}$ or 1




Jun 15-11:20 AM

Irrational Numbers

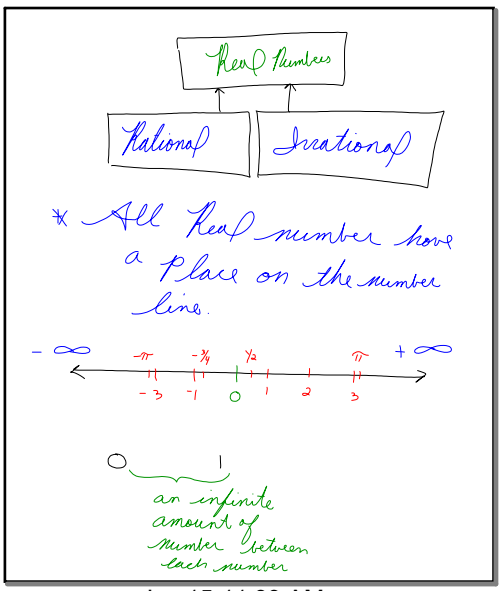
$\mathcal{IR} = \{x \mid x$ is not a Rational number$\}$

$\pi \approx 3.14\ldots$

$e \approx 2.78\ldots$

$\sqrt{2}, \sqrt{3}, \sqrt[3]{5}$

Jun 15-11:29 AM




Jun 15-11:39 AM

What is a "Well Defined" Set?

* A set should always be well defined.

* We should be able to determine if something is or is not a member of a set.

e.g.

① $\mathcal{A} = \{x \mid x$ is a winner of an Academy Award$\}$

② $\mathcal{T} = \{x \mid x$ is tall$\}$

$= \{x \mid x$ is 6 feet or greater$\}$

Jun 15-11:45 AM

$\mathcal{N} = \{1, 2, 3, \ldots\}$

Is 14 a member of $\mathcal{N}$?
Yes!

$14 \in \mathcal{N}$

"an element of"

$-14 \notin \mathcal{N}$

Jun 15-11:54 AM

The "Cardinal number" of a set

* a count of the number of members.

e.g.

① $\mathcal{B} = \{3, 4, 9, 10\}$

$n(\mathcal{B}) = 4$ i.e. a finite set

Cardinal Notation

Jun 15-11:57 AM

Recall: the null set is the empty set.

$\emptyset$

$n(\emptyset) = 0$

Jun 15-12:02 PM

a finite set is a set where the count is represented by a whole number.

Jun 15-12:07 PM

2.2 Comparing Sets

Equality of Sets

* Any two sets are equal if they have the same members.

$\mathcal{A} = \mathcal{B}$

$\mathcal{A} = \{1, 2, 3, 4\}$

$n(\mathcal{A}) = 4$

$\mathcal{B} = \{3, 2, 1, 4\}$

$n(\mathcal{B}) = 4$

Jun 15-12:06 PM

$\mathcal{D} = \{x \mid x$ is a citizen of the U.S.$\}$

$\mathcal{E} = \{y \mid y$ was born in the U.S.$\}$

Is $\mathcal{D} \neq \mathcal{E}$ equal?

* $\mathcal{D} \neq \mathcal{E}$

Jun 15-12:15 PM

## Sub Sets

* $A$ is a subset of $B$ if all the elements of $A$ are also elements of $B$.

$A \subseteq B$

↑ subset

$A = \{a, b, c, d\}$

$B = \{1, 2, 3, a, d, b, c\}$

So, $A \subseteq B$, but $A \neq B$

Jun 15-12:19 PM

What if $A \subseteq B$ and $A \neq B$

* We say that $A$ is a "Proper" subset of $B$.

$A \subset B$

↑ Proper subset

Jun 15-12:24 PM

Hwy #4 - Sets from last week

Jun 15-12:30 PM