CSCI 301 - Lecture 1

Roster: $\{1, 2, 3\}$

$\{\text{True}, \text{False}\}$

Set builder:

$\{\underset{\text{expression}}{\text{variable}} : \text{membership test}\}$

$S = \{1, 3, 5, 7, 9\}$

$S = \{x : x \text{ is a } \overset{\text{odd}}{\wedge} \text{pos. integer} < 10\}$

$= \{x \in \mathbb{Z}^+ : x \text{ is odd and } x < 10\}$

($\mathbb{Z}^+$: pos. ints)

$= \{2k - 1 : k \in \mathbb{Z}^+ \text{ and } k \leq 5\}$

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1 A

Odd integers

Perfect squares

Squares of odd ints

$\{x : x \in \mathbb{N} \text{ and } \sqrt{x} \in \mathbb{N}\}$ (redundant)

$\{k^2 : k \in \mathbb{Z}^+\}$

Positive Rationals ($\mathbb{Q}^+$)

$\{a/b : a, b \in \mathbb{Z}^+ \}$

Cardinality

If S has n distinct elements an $n \in \mathbb{Z}$
S is finite.

Else, S is infinite

The cardinality of a finite set S is the number of (distinct) elements in S.

written $|S|$

Ex:

$\mathbb{N}$ is infinite

$|\{1, 2, 3\}| = 3$

$|\{a : a \text{ is an english letter}\}| = 26$

Fact: Sets can contain sets.

$S = \{\{1,2\}, \{2,3\}, \emptyset\}$

Facts: $\{1,2\} \in S$ $\quad |S| = 3$

$1 \notin S$ $\quad \emptyset \in S$

$$|\{\emptyset, \{\{\emptyset\}\}\}|$$