

CompSci 162
Spring 2023 Lecture 1:
Sets and Functions

Let's see some functions

Given sets A and B ,

► What does $|A| = |B|$ mean?

- Cardinality same

- equinumerable

- $\exists$ bijective $f: A \leftrightarrow B$

$f(\text{guacamole}) = \text{Colossus of Rhodes}$

$|A| \leq |B|$? injective, possibly bijective

$|A| < |B|$? injective not bijective

How many naturals?

in $\mathbb{N}$, $0 \in \mathbb{N}$

► $\mathbb{N} = \{0, 1, 2, \dots\}$

► $|\mathbb{N}| = \aleph_0$ "countably infinite"

► How many odd numbers are there?

$$f(x) = 2x+1$$

$$x \in \mathbb{N}$$

odd

~~injective~~

bijjective

injective: $f(i) = f(j) \Rightarrow i = j?$

surjective: $\frac{x-1}{2} \in \mathbb{N}$