# Questions

- boundedness
- completeness
- ordered fields

# Variations of the notion of *order*

A *weak* order, usually written $\leq$, is a relation that is

- reflexive: $x \leq x$ for every $x$
- antisymmetric: if $x \leq y$ and $y \leq x$, then $x = y$
- transitive: if $x \leq y$ and $y \leq z$, then $x \leq z$

A *strict* order, usually written $<$, is a relation that is

- irreflexive: there is no $x$ for which $x < x$
- antisymmetric: if $x < y$, then it is not the case that $y < x$
- transitive: if $x < y$ and $y < z$, then $x < z$

In Definition 1.1.1 in the textbook, the order is assumed to be a strict order that additionally satisfies the trichotomy property: for every $x$ and $y$, either $x < y$ or $y < x$ or $x = y$ (exclusive "or").

# Fields

Examples.

$\mathbb{R}$, the real numbers.

$\mathbb{Q}$, the rational numbers.

$\mathbb{C}$, the complex numbers.

Integers modulo a prime number.

Non-examples.

$\mathbb{Z}$, the integers. (Multiplicative inverses are missing.)

$\mathbb{N}$, the natural numbers. (Missing both additive inverses and multiplicative inverses.)

# Assignment due next class

- Write solutions to Exercises 1.1.3 and 1.1.5.
- Read subsection 1.2.1 in the textbook.