Linear maps → Matrices
Geometry → vectors / vector spaces

set → collection of objects

$0 \notin \mathbb{N}$

$\mathbb{Z}$ → set of integers
$\mathbb{Q}$ → rational numbers

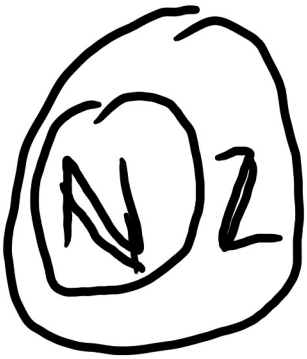
$$\left\{ \frac{p}{q} \mid p, q \in \mathbb{Z}, q \neq 0 \right\} = \mathbb{Q}$$

such that

$\mathbb{Q}$ is equal to any fraction p/q such that both p and q are elements of $\mathbb{Z}$ and q is not 0

$$\mathbb{C} = \{ a + bi \mid a, b \in \mathbb{R} \}$$

$\mathbb{N} \subset \mathbb{Z}$ one set contains another



$\mathbb{Q}$ → quaternions

$= \{a + bi + cj + dk \mid a, b, c, d \in \mathbb{R}\}$

$i^2 = j^2 = k^2 = ijk = -1$

Set c, d to 0, becomes complex number

Like how $5 + 0i$ is real, so

$\mathbb{R} \subset \mathbb{Q}$

Notation

A, B sets

$A \cup B$ union

→ A or B

→ could not overlap

$A \cap B$ intersection →

→ elements that belong to A and B

Order Relations

$\mathbb{Z}$ $a \leq b \iff b - a \in \mathbb{N} \cup \{0\}$

$\Rightarrow$ $a \Rightarrow b$, a is true if and only if b is true

Equation containing $x, y, z, w \ldots$ is linear if the exponent is 1 or 0

Linear system

$$\begin{cases} x + y + z + w = 6 \\ y + z + w = 4 \\ y + w = 2 \end{cases}$$

Find values (if they exist) of $x, y, z, w, \ldots$ that satisfy ALL equations

↳ infinite solutions

$y = y$ ∧ $w = 2 - y$