



$$|\mathcal{P}(S)| = 2^{|S|} = 2^6 = 64$$

Sets

{ , , }
membership

$$\begin{aligned} 3 - 2 &= 1 \\ 2 - 3 &= -1 \end{aligned}$$

$$\mathcal{P}(\{1, 2, 3\})$$

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

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

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

\in

\subseteq \subset

\supset \supseteq

\cap \cup \setminus

$|S|$

\mathcal{P}

$$\{1, 2\} \setminus \{1\} = \{2\}$$

$$\{1\} \setminus \{1, 2\} = \{\}$$

$\{\}$

$$\mathcal{P}(\{\}) = \{ \{\} \}$$

$$\mathcal{P}(\mathcal{P}(\{\})) = \{ \underbrace{\{\}}, \underbrace{\{\{\}\}} \}$$

$$\mathcal{P}(\mathcal{P}(\mathcal{P}(\{\}))) = \{ \underbrace{\{\}}, \underbrace{\{\{\}\}}, \underbrace{\{\{\{\}\}}, \underbrace{\{\{\}, \{\{\}\}\}} \}$$

$$\{ \underbrace{\{\emptyset}, \{\emptyset\}}, \underbrace{\{\{\emptyset\}}, \{\emptyset, \{\emptyset\}\}} \}$$

 \emptyset \emptyset \emptyset

/
/
/
/
/

{1}

1

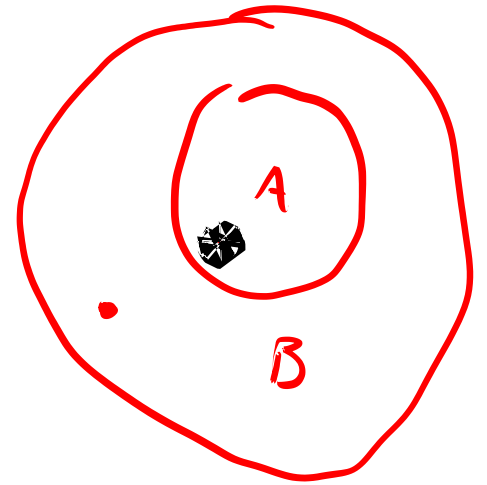
disjoint

{2, 1}

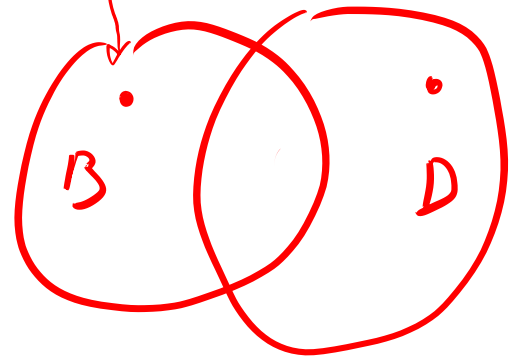
2

1

$\Rightarrow A \subset B$, could be empty



$B \subseteq D$
false



$$|A \cap D| > 0$$

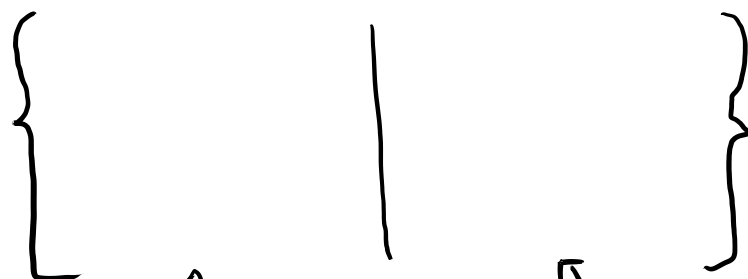
- could be empty, $C \subset B$
 $C \subset D$



$$B \cap D \subset B$$
$$B \cap D \subset D$$

\mathbb{Z} integers
 \mathbb{N} (non-negatives) Natural Num
 \mathbb{R} real
 \mathbb{Q} rational

Set builder notation



↑
 expression
 to
 generate
 members

↖
 Predicate
 eval to True or False

$y \in \{ A \mid B \}$
 if and only if
 Some thing makes B
 true
 and make A into y

$$\left\{ x^2 \mid x \in \mathbb{Z} \right\} = \{ 0, 1, 4, 9, 16, 25, \dots \}$$

integers
 ↓

$x = -3$
 $x = 3$
 ↓

$$= \mathbb{Z}^+ \cup \{0\} = \{1 \times 1 \mid x \in \mathbb{R}\}$$