

Review of Set Theory

- Defining Sets

$$A = \{1, 2, 5\}$$

$$B = \{1, *\}$$

$$C = \{1, \{5, 7\}, \pi\}$$

$$D = \{x: x \text{ is a real number and } x^2 < 7\}$$

- Membership

$x \in A$ means x is an element of A

$$1 \in \{1, 2, 5\}$$

$$* \in \{1, *\}$$

$$\{5, 7\} \in C$$

- Subsets

$S \subset A$ means every elt of S is also an elt of A

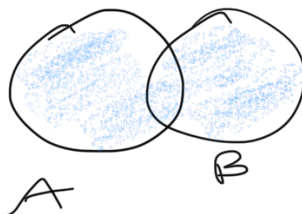
$$A = \{1, 2, 5\}$$

$$S = \{1, 2\} \subset A$$

$\{5, 7\}$ not subset of C

- Ways of Combining Sets

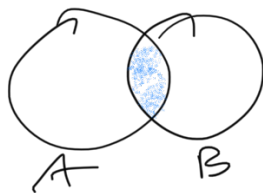
Union: $A \cup B = \{x: x \in A \text{ or } x \in B\}$



$$= A \cup B$$

Intersection $A \cap B = \{x: x \in A \text{ and } x \in B\}$

_____ $A \cap B$ _____

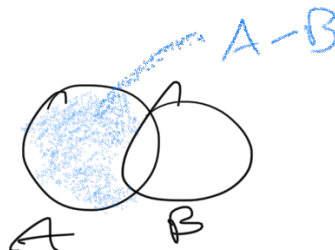


$$\equiv A \cap B$$

Complement / Difference

$$A - B = \{x : x \in A, x \notin B\}$$

(also written $A \setminus B$)



Paradox: (Russell)

$$\text{Consider } S = \{X : X \notin X\}$$

Set of all sets that don't contain themselves

Q: Is $S \in S$?