4 Sep 2025

Monday, September 8, 2025 9:17 PM

UNION: $A \cup B$: $\{x \in S : x \in A \text{ OR } x \in B\}$

INTERSECT: $A \cap B$: $\{x \in S : x \in A \text{ AND } x \in B\}$

COMPLEMENT: A^c : $\{x \in S : x \notin A\}$

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

INF. UNION: $\bigcup_{i=1}^{\infty} A_i = \{x \in S, x \in A_i \ \exists \ \underbrace{A_i}_{\text{FOR SOME}}\}$

INF. INT: $\bigcap_{i=1}^{\infty} A_i = \{x \in S, x \in A_i \ \underbrace{\forall}_{\text{FOR ALL}} A_i\}$

RELATIONSHIPS:

CONTAINMENT: $B \subseteq A$ (A SUBSET B): $x \in A$ MEANS $x \in B$

EQUALITY: TWO SETS = IF CONTAIN EACH OTHER: $A = B \therefore A \subseteq B, B \subseteq A$

DISJOINT: $A \cap B = \{\}$

PROPERTIES:

COMMUTATIVITY: $A \cup B = B \cup A$ $A \cap B = B \cap A$

ASSOCIATIVITY: $A \cup (B \cup C) = (A \cup B) \cup C$ $A \cap (B \cap C) = (A \cap B) \cap C$

DISTRIBUTIVE: $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

DE MORGAN'S: $(A \cup B)^c = A^c \cap B^c$ $(A \cap B)^c = A^c \cup B^c$ CDCEA