

2. Set Operations and the Laws of Set Theory

The Laws of Set Theory

(1) $\overline{\overline{A}} = A$ Law of *Double Complement*

(2) $\overline{A \cup B} = \overline{A} \cap \overline{B}$ *Demorgan's Laws*

$$\overline{A \cap B} = \overline{A} \cup \overline{B}$$

(3) $A \cup B = B \cup A$ *Commutative Laws*

$$A \cap B = B \cap A$$

(4) $A \cup (B \cup C) = (A \cup B) \cup C$ *Associative Laws*

$$A \cap (B \cap C) = (A \cap B) \cap C$$

(5) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ *Distributive Laws*

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

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(6) $A \cup A = A, A \cap A = A$ *Idempotent Laws*

(7) $A \cup \phi = A, A \cap U = A$ *Identity Laws*

(8) $A \cup \bar{A} = U, A \cap \bar{A} = \phi$ *Inverse Laws*

(9) $A \cup U = U, A \cap \phi = \phi$ *Domination Laws*

(10) $A \cup (A \cap B) = A$ *Absorption Laws*

$A \cap (A \cup B) = A$