1) Identity laws.

a) $A \cup \phi = A$.

let x be the arbitrary element.

let $x \in A \cup \phi \Rightarrow x \in A$ or $x \in \phi$.

Since ϕ does not have any elements

$\Rightarrow x \in A$.

Since x is an arbitrary element, every element in $A \cup \phi$ is va element of A.

$\Rightarrow A \cup \phi \subset A \longrightarrow$ ①

let $y \in A \Rightarrow y \in A$

$\Rightarrow y \in A$ or $y \in \phi$.

Since ϕ is a null set, it doesnot contain any elements.

$\Rightarrow y \in (A \cup \phi)$

Since y is an arbitrary element, every element of A is an element of $A \cup \phi$.

$\Rightarrow A \subset A \cup \phi \longrightarrow$ ②.

from ① and ②.

Since $A \cup \phi \subset A$ and $A \subset A \cup \phi$. $\Rightarrow$ $\underline{A \cup \phi = A}$

b) $A \cap U = A$.

let x be the arbitrary element

let $x \in A \cap U \Rightarrow x \in A$ and $x \in U$.

Since U is the Universal set every element is in U.

$\Rightarrow x \in A$.

Since x is an arbitrary element, every element of $A \cap U$ is an element of A.

$\Rightarrow A \cap U \subset A \longrightarrow (1)$.

let $y \in A \Rightarrow y \in A$

Since U is the universal set,.

$\Rightarrow y \in A$ and $y \in U$.

$\Rightarrow y \in (A \cap U)$

Since y is an arbitrary element, every elemen of A is an element of $A \cap U$.

$\Rightarrow A \subset A \cap U \longrightarrow (2)$.

from (1) & (2).

$A \cap U \subset A$ and $A \subset A \cap U$.

$\Rightarrow A \cap U = A$

2.

a

Page No.
Date: / /

2. Domination law

a) $A \cup U = U$

let $x \in A \cup U \Rightarrow x \in A$ or $x \in U$.

Since U is the universal set, it contains A.

$\Rightarrow x \in U$.

Since x is an arbitrary element, ~~each~~ every element of $A \cup U$ is an element of U.

$\Rightarrow (A \cup U) \subset U \longrightarrow ①$.

let $y \in U \Rightarrow y \in U$.

$\Rightarrow y \in U$ or $y \in A$.

$\Rightarrow y \in (U \cup A)$.

$\Rightarrow y \in (A \cup U)$.

Since y is an arbitrary element, every element of U is an element of $A \cup U$.

ie $U \subset (A \cup U) \longrightarrow ②$

from ① and ②.

$(A \cup U) \subset U$ and $U \subset (A \cup U)$

$\Rightarrow A \cup U = U$

b) $A \cap \phi = \phi$.

let $x \in A \cap \phi \rightarrow x \in A$ and $x \in \phi$.

Since ϕ does not have any element

$\Rightarrow x \in \phi$.

Since x is an arbitrary element, every element of $A \cap \phi$ is an element of ϕ.

$\Rightarrow A \cap \phi \subset \phi \longrightarrow (1)$

let $y \in \phi \Rightarrow y \in \phi$

Since there is no element in ϕ.

$\Rightarrow y \in (A \cap \phi)$.

Since y is an arbitrary element, every element of ϕ is an element of $A \cap \phi$.

$\Rightarrow \phi \subset A \cap \phi \longrightarrow (2)$

from (1) and (2).

$A \cap \phi \subset \phi$ and $\phi \subset A \cap \phi$

$\Rightarrow A \cap \phi = \phi$

3. Idempotent law

a) $A \cup A = A$

let $x \in A \cup A \Rightarrow x \in A$ or $x \in A$

$\Rightarrow x \in A$.

Since x is an arbitrary element, every element in $A \cup A$ is an element of A

$\Rightarrow A \cup A \subset A$. $\longrightarrow$ ①

let $y \in A \Rightarrow y \in (A \cup A)$

(since $y \in A$).

Since y is an arbitrary element, every element in A is an element of $A \cup A$.

$\Rightarrow A \subset A \cup A$ $\longrightarrow$ ②

from ① & ②

$A \cup A \subset A$ and $A \subset A \cup A$

$\Rightarrow \underline{A \cup A = A}$.

b) $A \cap A = A$

let $x \in A \cap A \Rightarrow x \in A$ and $x \in A$.

$\Rightarrow x \in A$.

Since x is an arbitrary element, every element of $A \cap A$ is an element of A.

$\Rightarrow A \cap A \subset A$. $\longrightarrow$ ①

let $y \in A \rightarrow y \in A$ and $y \in A$.

$\Rightarrow y \in (A \cap A)$

Since y is an arbitrary element, every element of A is an element of $A \cap A$

$\Rightarrow A \subset A \cap A$ $\longrightarrow$ ②

from ① & ②

$A \cap A \subset A$ and $A \subset A \cap A$

$\Rightarrow \underline{A \cap A = A}$.

$\Rightarrow A \cap A = A$

4). Complementation law.

$\overline{(\overline{A})} = A$

let $x \in (A')' \Rightarrow x \notin A'$

$\Rightarrow x \in A$. (since x is not in $\bar{A}$)

since x is an arbitrary element. every element of $\overline{(\overline{A})}$ is an element of A

$\Rightarrow \overline{(\overline{A})} \subset A. \rightarrow$ ①.

let $y \in A \Rightarrow y \notin A'$

$\Rightarrow y \in (A')'$

Since y is an arbitrary element. every element of A is an element of $\overline{(\overline{A})} \Rightarrow A \subset \overline{(\overline{A})} \rightarrow$ ②

from ① & ②.

5. Commutative law.

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

let $x \in A \cup B \Rightarrow x \in A$ or $x \in B$

$\Rightarrow x \in B$ or $x \in A$

$\Rightarrow x \in (B \cup A)$

since x is an arbitrary element .. every element in $A \cup B$ is an element of $B \cup A$

$\Rightarrow A \cup B \subset B \cup A \longrightarrow (1)$

let $y \in B \cup A \Rightarrow y \in B$ or $y \in A$

$\Rightarrow y \in A$ or $y \in B$

$\Rightarrow y \in (A \cup B)$

since y is an arbitrary element. every element in $B \cup A$ is an element of $A \cup B$.

$\Rightarrow B \cup A \subset A \cup B \longrightarrow (2)$

from (1) & (2).

$A \cup B \subset B \cup A$ and $B \cup A \subset A \cup B$.

$\Rightarrow \underline{A \cup B = B \cup A}$.

(b) $A \cap B = B \cap A$..

let $x \in A \cap B \Rightarrow x \in A$ and $x \in B$

$\Rightarrow x \in B$ and $x \in A$

$\Rightarrow x \in (B \cap A)$.

since x is an arbitrary element. every element $A \cap B$ is an element of $B \cap A$

$\Rightarrow A \cap B \subset B \cap A$

let $y \in (B \cap A) \Rightarrow y \in B$ and $y \in A$

$\Rightarrow y \in A$ and $y \in B$

$\Rightarrow y \in (A \cap B)$.

Since y is an arbitrary element. every element of $(B \cap A)$ is an element of $A \cap B$.

$\Rightarrow B \cap A \subset A \cap B \rightarrow$ ②

from ① & ②

$A \cap B \subset B \cap A$ and $B \cap A \subset A \cap B$

$\Rightarrow A \cap B = B \cap A$.

). Associative laws

a). $A \cup (B \cup C) = (A \cup B) \cup C$

let $x \in A \cup (B \cup C) \Rightarrow x \in A$ or $x \in (B \cup C)$

$\Rightarrow x \in A$ or $x \in B$ or $x \in C$.

$\Rightarrow x \in A$ or $x \in B$ or $x \in C$

$\Rightarrow x \in (A \cup B)$ or $x \in C$

$\Rightarrow x \in (A \cup B) \cup C$.

Since x is an arbitrary element; every element of $A \cup (B \cup C)$ is an element of $(A \cup B) \cup C$.

$\Rightarrow A \cup (B \cup C) \subset (A \cup B) \cup C. \longrightarrow$ ①

let $y \in (A \cup B) \cup C \Rightarrow y \in (A \cup B)$ or $y \in C$

$\Rightarrow y \in A$ or $y \in B$ or $y \in C$

$\Rightarrow y \in (A \cup B) \cup C$.

Since y is an arbitrary element, every element of $(A \cup B) \cup C$ is element of $A \cup (B \cup C)$.

$\Rightarrow (A \cup B) \cup C \subset A \cup (B \cup C) \longrightarrow ②$

from ① & ② $\Rightarrow$

$(A \cup B) \cup C \subset A \cup (B \cup C)$ and $A \cup (B \cup C) \subset (A \cup B) \cup C$.

$\Rightarrow (A \cup B) \cup C = A \cup (B \cup C)$.

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

let $x \in A \cap (B \cap C) \Rightarrow x \in A$ and $x \in (B \cap C)$

$\Rightarrow x \in A$ and $x \in B$ and $x \in C$

$\Rightarrow x \in (A \cap B)$ and C

$\Rightarrow x \in (A \cap B) \cap C$

Since x is an arbitrary element. All elements in $A \cap (B \cap C)$ is a element of $(A \cap B) \cap C$.

$\Rightarrow A \cap (B \cap C) \subset (A \cap B) \cap C \longrightarrow ①$

let $y \in (A \cap B) \cap C \Rightarrow x \in (A \cap B)$ and $x \in C$

$\Rightarrow x \in A$ and $x \in B$ and $x \in C$

$\Rightarrow x \in A$ and ~~(or~~ $x \in (B \cap C)$

$\Rightarrow x \in A \cap (B \cap C)$

Since y is an arbitrary element. all the elements in $(A \cap B) \cap C$ is an element of $A \cap (B \cap C)$.

$\Rightarrow (A \cap B) \cap C \subset A \cap (B \cap C) \longrightarrow ②$

from ① & ②

$(A \cap B) \cap C \subset A \cap (B \cap C)$ and $A \cap (B \cap C) \subset (A \cap B) \cap C$

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

7. **Distributive Law**

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

let $x \in A \cap (B \cup C) \Rightarrow x \in A$ and $x \in (B \cup C)$

$\Rightarrow x \in A$ and $x \in B$ or $x \in C$.

$\Rightarrow x \in A$ and $x \in B$ or $x \in A$ and $x \in C$

$\Rightarrow x \in (A \cap B)$ or $x \in (A \cap C)$

$\Rightarrow x \in (A \cap B) \cup (A \cap C)$.

Since x is an arbitrary element. every element of $A \cap (B \cup C)$ is an element of $(A \cap B) \cup (A \cap C)$

$\Rightarrow A \cap (B \cup C) \subset (A \cap B) \cup (A \cap C) \longrightarrow (1)$

let $y \in (A \cap B) \cup (A \cap C) \Rightarrow$ ~~y∈ A and B~~

$\Rightarrow y \in (A \cap B)$ or $y \in (A \cap C)$

$\Rightarrow y \in A$ and $y \in B$ or $y \in A$ and $y \in C$.

$\Rightarrow y \in A$ and $y \in B$ or $y \in C$

$\Rightarrow y \in A$ and $y \in (B \cup C)$

$\Rightarrow y \in A \cap (B \cup C)$

Since y is an arbitrary element. ~~it~~ every element of ~~A∩(B∪C)~~ $(A \cap B) \cup (A \cap C)$ is an element of $A \cap (B \cup C)$.

$\Rightarrow (A \cap B) \cup (A \cap C) \subset A \cap (B \cup C) \longrightarrow (2)$

from (1) & (2)

$A \cap (B \cup C) \subset (A \cap B) \cup (A \cap C)$ and $(A \cap B) \cup (A \cap C) \subset A \cap (B \cup C)$

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

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

let $x \in A \cup (B \cap C) \Rightarrow x \in A$ or $x \in (B \cap C)$

$\Rightarrow x \in A$ or $x \in B$ and $x \in C$.

$\Rightarrow x \in A$ or $x \in B$ and $x \in A$ or $x \in C$

$\Rightarrow x \in (A \cup B)$ and $x \in (A \cup C)$

$\Rightarrow x \in (A \cup B) \cap (A \cup C)$.

Since x is an arbitrary element, every element of $A \cup (B \cap C)$ is an element of $(A \cup B) \cap (A \cup C)$.

$\Rightarrow A \cup (B \cap C) \subset (A \cup B) \cap (A \cup C)$. $\longrightarrow$ ①

let $y \in (A \cup B) \cap (A \cup C) \Rightarrow y \in (A \cup B)$ and $y \in (A \cup C)$.

$\Rightarrow y \in A$ or $y \in B$ and $y \in A$ or $y \in C$

$\Rightarrow y \in A$ and $y \in B$ or $y \in C$

$\Rightarrow y \in A$ and $y \in (B \cup C)$

$\Rightarrow y \in A \cap (B \cup C)$.

Since y is an arbitrary element, every element of $(A \cup B) \cap (A \cup C)$ is an element of $A \cup (B \cap C)$.

$\Rightarrow (A \cup B) \cap (A \cup C) \subset A \cup (B \cap C)$. $\longrightarrow$ ②

from ① & ②

$\Rightarrow A \cup (B \cap C) \subset (A \cup B) \cap (A \cup C)$ and $(A \cup B) \cap (A \cup C) \subset A \cup (B \cap C)$

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

8. De Morgan's Law

a) $\overline{A \cup B} = \bar{A} \cap \bar{B}$

let $x \in \overline{A \cup B} = x \notin A \cup B$

$\Rightarrow x \notin A$ or $x \notin B$.

$\Rightarrow x \in \bar{A}$ and $x \in \bar{B}$

Since x is an arbitrary element. every element of $\overline{A \cup B}$ is an element of $\bar{A} \cap \bar{B}$.

$\Rightarrow \overline{A \cup B} \subset \bar{A} \cap \bar{B} \longrightarrow (1)$

let $y \in \bar{A} \cap \bar{B} \Rightarrow y \in \bar{A}$ and $y \in \bar{B}$.

$\Rightarrow y \notin A$ or $y \notin B$

$\Rightarrow y \notin (A \cup B)$

$\Rightarrow y \in \overline{(A \cup B)}$

Since y is an arbitrary element. every element of $\bar{A} \cap \bar{B}$ is an element of $\overline{A \cup B}$

$\Rightarrow \bar{A} \cap \bar{B} \subset \overline{A \cup B} \rightarrow (2)$

from (1) & (2) .

$\bar{A} \cap \bar{B} \subset \overline{A \cup B}$ and $\overline{A \cup B} \subset \bar{A} \cap \bar{B}$

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

b) $\overline{A \cap B} = \bar{A} \cup \bar{B}$

let $x \in \overline{A \cap B} \Rightarrow x \notin A \cap B$

$\Rightarrow x \notin A$ and $x \notin B$.

$\Rightarrow x \in A'$ or $x \in B'$

$\Rightarrow x \in (\bar{A} \cup \bar{B})$.

Since x is an arbitrary element. every element of $\overline{A \cup B}$ is an element of $\bar{A} \cap \bar{B}$

$\overline{A \cap B} \subset \bar{A} \cup \bar{B} \longrightarrow ①$

let $y \in \bar{A} \cup \bar{B} \Rightarrow y \in \bar{A}$ or $y \in \bar{B}$

$\Rightarrow y \notin A$ and $y \notin B$

$\Rightarrow y \notin (A \cap B)$

$\Rightarrow y \in (\overline{A \cap B})$

Since y is an arbitrary element. every element of $\bar{A} \cup \bar{B}$ is an element of $\overline{A \cap B}$.

$\Rightarrow \bar{A} \cup \bar{B} \subset \overline{A \cap B} \longrightarrow ②$

from ① & ②

$\overline{A \cap B} \subset \bar{A} \cup \bar{B}$ and $\bar{A} \cup \bar{B} \subset \overline{A \cap B}$

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

Absorption laws

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

let $x \in A \cup (A \cap B) \Rightarrow x \in A$ or $x \in (A \cap B)$

$\Rightarrow x \in A$ or $x \in A$ and B).

$\Rightarrow x \in A$

Since x is an arbitrary element. every element of A $\cup$ (A $\cap$ B) is an element of A

$\Rightarrow A \cup (A \cap B) \subset A \longrightarrow ①$

let $y \in A \Rightarrow y \in A \cup (A \cap B)$.

Since y is an arbitrary element. every element of A is an element of $A \cup (A \cap B)$

$\Rightarrow A \subset A \cup (A \cap B) \longrightarrow ②$

from ① & ②

$A\cup(A\cap B) \subset A$ and $A \subset A\cup(A\cap B)$

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

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

let $x \in A\cap(A\cup B) \Rightarrow x \in A$ and $x \in (A\cup B)$

$\Rightarrow x \in A$ and $x \in A$ or $x \in B)$

$\Rightarrow x \in A$ and $x \in A$ or $x \in A$ and $x \in B$

$\Rightarrow x \in A$.

Since x is an arbitrary element. every element of. $A\cap(A\cup B)$ is an element of A.

$\Rightarrow A\cap(A\cup B) \subset A. \longrightarrow$ ①

let $y \in A \Rightarrow y \in A$.

$\Rightarrow y \in A$ and $y \in A$ or B

$\Rightarrow y \in A \cap (A \cup B)$

Since y is an arbitrary element. every element of A is an element of $A\cap(A\cup B)$.

$\Rightarrow A \subset A\cap(A\cup B). \longrightarrow$ ②

from ① & ②

$A\cap(A\cup B) \subset A$ and $A \subset A\cap(A\cup B)$

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

10) Complement laws.

a) $A \cup \bar{A} = U$

let $x \in A \cup \bar{A} \Rightarrow x \in A$ or $x \in A'$

$\Rightarrow U$ the universal set

Since x is an arbitrary element. every element in $A \cup \bar{A}$ is an element of U

$\Rightarrow A \cup \bar{A} \subset U$ ——— ①

let $y \in U \Rightarrow y \in A$ or $y \in \bar{A}$

$\Rightarrow y \in (A \cup \bar{A})$.

Since y is an arbitrary element. every element in U is an element of $(A \cup \bar{A})$

$\Rightarrow U \subset (A \cup \bar{A})$ ——— ②

from ① & ② —

$A \cup \bar{A} \subset U$ and $U \subset (A \cup \bar{A})$

$A \cup \bar{A} = U$

$A \cap \bar{A} = \phi$.

let $x \in A \cap \bar{A} \Rightarrow x \in A$ and $x \notin \bar{A}$

$\Rightarrow x \in \phi$.

Since x is an arbitrary element. every element in $A \cap \bar{A}$ is an element of ϕ.

$\Rightarrow A \cap \bar{A} \subset \phi$. ——— ①

let $y \in \phi \Rightarrow y \in A$ and $x \in \bar{A}$

$\Rightarrow y \in (A \cap \bar{A})$

since y is an arbitrary element every element in $y \in \phi$ is an element of $(A \cap \bar{A})$

$\Rightarrow \phi \subset (A \cap \bar{A}) \longrightarrow ②$

from ① & ②

$(A \cap \bar{A}) \subset \phi$ and $\phi \subset (A \cap \bar{A})$.

$\Rightarrow A \cap \bar{A} = \phi$.

HAVANA. A
FYIMP CS

37) Show that if A is a Subset of a Universal Set U, then

a) $A \oplus A = \phi$

let $x \in A \oplus A \Leftrightarrow (x \notin A$ and $x \in A')$ or $(x \in A'$ and $x \notin A)$

$\Leftrightarrow x \notin (A \cap A')$

$\Leftrightarrow \phi$.

Since x is an arbitrary element. every element of $A \oplus A$ is an element of $\phi \Rightarrow A \oplus A \subset \phi$

let $y \in \phi \Rightarrow (y \in A$ and $y \in A')$ or $(y \notin A$ and $y \in A)$.

$\Rightarrow A \oplus A$

Since y is an arbitrary element. every element of ϕ is an element of $A \oplus A \Rightarrow \phi \subset A \oplus A$.

ie $A \oplus A \subset \phi$ and $\phi \subset A \oplus A$

$\Rightarrow A \oplus A = \phi$

b) $A \oplus \phi = A$.

let $x \in A \oplus \phi \Rightarrow x \in A$ and $x \notin \phi$ or $x \notin A$ and $x \in \phi$.

Since {} has no elements $x \notin \phi$ is always true

so

$\Rightarrow x \in A$.

Since x is an arbitrary element. every element $A \oplus \phi$ is an element of A

$\Rightarrow A \oplus \phi \subset A$

let $y \in A \Rightarrow y \in A$

$\Rightarrow y \in A$ and $y \notin \phi$.

$\Rightarrow y \in A \oplus \{\}$.

Since y is an arbitrary element. every element of A is an element of $A \oplus \phi \Rightarrow A \subset A + \phi$

ie $A \oplus \phi = A$

c) $A \oplus U = \bar{A}$

let $x \in A \oplus U \Rightarrow (x \in A$ and $x \notin U)$ or $(x \notin A$ and $x \in U)$.

Since $A \subset U$

$\Rightarrow (x \notin A$ and $x \in U)$

$\Rightarrow x \in \bar{A}$

Since x is an arbitrary element. every element in $A \oplus U$ is an element of $\bar{A}$ $\Rightarrow A \oplus U \subset \bar{A}$

let $y \in \bar{A} \Rightarrow y \notin A$ and $x \in U$

$\Rightarrow y \in A \oplus U$

Since y is an arbitrary element. every element in $\bar{A}$ is an element of $A \oplus U \Rightarrow \bar{A} \subset A \oplus U$

$\Rightarrow A \oplus U = \bar{A}$

d) $A \oplus \bar{A} = U$

let $x \in A \oplus \bar{A} \Rightarrow (x \in A$ and $x \notin \bar{A})$ or $(x \notin A$ and $x \in \bar{A})$

$\Rightarrow x \in U$

Since x is an arbitrary element. every element in $A \oplus \bar{A}$ is an element of $U \Rightarrow A \oplus \bar{A} \subset U$

let $y \in U \Rightarrow y \in A$ or $y \in \bar{A}$

$\Rightarrow (y \in A$ and $y \notin \bar{A})$ or $(y \notin A$ and $y \in \bar{A})$

$\Rightarrow y \in A \oplus \bar{A}$

Since y is an arbitrary element. every element in U is an element of A

38) Sh

a) A

$\Rightarrow U$

$\Rightarrow A$

$\Rightarrow U \subset A \oplus \bar{A}$

$\Rightarrow A \oplus \bar{A} = U$

38) Show that if A and B are sets, then,

a) $A \oplus B = B \oplus A$

let $x \in A \oplus B \Rightarrow (x \in A$ and $x \notin B)$ or $x \in B$ and $x \notin A$.

$\Rightarrow (x \in A$ and $x \in \bar{B})$ or $(x \in B$ and $x \in \bar{A})$

$\Rightarrow x \in B \oplus A$

Since x is an arbitrary element every element of $A \oplus B$ is an element of $B \oplus A$. $\Rightarrow A \oplus B \subset B \oplus A$.

let $y \in B \oplus A \Rightarrow (y \in B$ and $y \notin A)$ or $y \in A$ and $y \notin B$

$\Rightarrow y \in B$ and $y \in \bar{A}$ or $y \in A$ and $y \in \bar{B}$

$\Rightarrow y \in A \oplus B$.

Since y is an arbitrary element. every element of $B \oplus A$ is an element of $A \oplus B \Rightarrow B \oplus A \subset A \oplus B$.

$\Rightarrow$ Since $A \oplus B \subset B \oplus A$ & $B \oplus A \subset A \oplus B$

$\Rightarrow A \oplus B = B \oplus A$.

) $(A \oplus B) \oplus B = A$

let x be an arbitrary element

$x \in (A \oplus B) \oplus B \Rightarrow (x \in A \oplus B$ and $x \notin B)$ or $(x \notin A \oplus B$ and $x \in$

$\Rightarrow ((x \in A$ and $x \notin B)$ or $(x \notin A$ and $x \in B)$ and $x \notin B)$

or $(x \notin A$ or $x \in B$ and $x \in B)$

$\Rightarrow (x \in A \text{ and } x \notin B) \text{ or } (x \notin A \text{ and } x \in B \text{ and } x \in B)$.

$\Rightarrow x \in A \text{ and } x \notin B$

$\Rightarrow x \in A$ Since x is an arbitrary element, every element in $(A \oplus B) \oplus B$ is an element of $A \Rightarrow (A \oplus B) \oplus B \subset A$.

let $y \in A \Rightarrow y \in A \text{ and } (y \notin B \text{ or } y \in B)$.

$\Rightarrow (y \in A \text{ and } y \notin B) \text{ or } (y \in A \text{ and } y \in B \text{ and } y \in B)$.

$\Rightarrow ((y \in A \text{ and } y \notin B) \text{ or } (y \notin A \text{ and } y \in B) \text{ and } y \notin B)$.

or $(y \notin A \text{ or } y \in B \text{ and } y \in B)$.

$\Rightarrow (y \in A \oplus B \text{ and } y \notin B) \text{ or } (y \notin A \oplus B \text{ and } y \in B)$

$\Rightarrow$ ~~$(y \notin (A \oplus$~~

$\Rightarrow y \in (A \oplus B) \oplus B$.

Since y is an arbitrary element, every element in A is an element of $(A \oplus B) \oplus B$.

$\Rightarrow A \subset (A \oplus B) \oplus B$.

$\Rightarrow (A \oplus B) \oplus B = A$.

39. What can you say about the sets A and B if $A \oplus B = A$?

$A \oplus B = (A - B) \cup (B - A)$

ϕ ~~$A \cap B$~~

$A \oplus B \Rightarrow (x \in A \text{ and } x \notin B) \text{ or } (x \notin A \text{ and } x \in B)$

$\Rightarrow$ if $x \in A,\ x \notin B$

$\Rightarrow x \in A$.

$\Rightarrow$ ~~A & B are disjoint sets.~~

$\Rightarrow$ B can be a null set.