

Solution 8

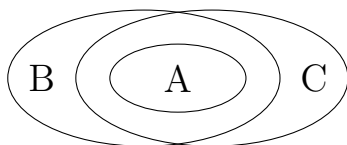
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2.1

08. $B \subseteq A \quad C \subseteq A \quad C \subseteq D$

12. a) $\emptyset \in \{\emptyset\}$ true
b) $\emptyset \in \{\emptyset, \{\emptyset\}\}$ true
c) $\{\emptyset\} \in \{\emptyset\}$ false
d) $\{\emptyset\} \in \{\{\emptyset\}\}$ true
e) $\{\emptyset\} \subset \{\emptyset, \{\emptyset\}\}$ true
f) $\{\{\emptyset\}\} \subset \{\emptyset, \{\emptyset\}\}$ true
g) $\{\{\emptyset\}\} \subset \{\{\emptyset\}, \{\emptyset\}\}$ false



18.

24. Contrapositive: if $A \neq B$, then A and B are two sets with not same power set.

let $P(X)$ means the power set of X .

$$\because A \subseteq P(A) \text{ and } B \subseteq P(B)$$

$$\therefore P(A) \neq P(B)$$

So, $A = B$, if A and B are two sets with the same power set.

34. a) $\{(a, x, 0), (a, x, 1), (a, y, 0), (a, y, 1), (b, x, 0), (b, x, 1), (b, y, 0), (b, y, 1), (c, x, 0), (c, x, 1), (c, y, 0), (c, y, 1)\}$
b) $\{(0, x, a), (0, x, b), (0, x, c), (0, y, a), (0, y, b), (0, y, c), (1, x, a), (1, x, b), (1, x, c), (1, y, a), (1, y, b), (1, y, c)\}$
c) $\{(0, a, x), (0, a, y), (0, b, x), (0, b, y), (0, c, x), (0, c, y), (1, a, x), (1, a, y), (1, b, x), (1, b, y), (1, c, x), (1, c, y)\}$
d) $\{(x, x, x), (x, x, y), (x, y, x), (x, y, y), (y, x, x), (y, x, y), (y, y, x), (y, y, y)\}$

48. a) $\{1, 2, 3, 4, \dots\}$

b) \emptyset

c) $\{\dots, -3, -2, -1, 2, 3, 4, \dots\}$

2.2

04. Find $A \subseteq B$

- a) $A \cup B = B = \{a, b, c, d, e, f, g, h\}$
- b) $A \cap B = A = \{a, b, c, d, e\}$
- c) $A - B = \emptyset$
- d) $B - A = \{f, g, h\}$

21. a) Proof is as follows.

A	B	$A - B$	\overline{B}	$A \cap \overline{B}$
0	0	0	1	0
0	1	0	0	0
1	0	1	1	1
1	1	0	0	0

b) Proof is as follows.

A	B	$A \cap B$	\overline{B}	$A \cap \overline{B}$	$(A \cap B) \cup (A \cap \overline{B})$
0	0	0	1	0	0
0	1	0	0	0	0
1	0	0	1	1	1
1	1	1	0	0	1

32. a) No. $A = \{1\}, B = \{1, 2\}, C = \{1, 2, 3\}$ $A \cup C = B \cup C = C$ but $A \neq B$

b) No. $A = \emptyset, B = \{1\}, C = \{2, 3\}$ $A \cap C = B \cap C = \emptyset$ but $A \neq B$

c) Yes.

Suppose $A \neq B$, let $x_0 \in A, x_0 \notin B$

$\therefore A \cup C = B \cup C \quad \therefore x_0 \in C$

$\therefore A \cap C = B \cap C$ and $x_0 \in A$ and $x_0 \in C$

$\therefore x_0 \in A \cap C \Rightarrow x_0 \in B \cap C \Rightarrow x_0 \in B$

So, the suppose is not right, and the original proposition is right.

54. Find $A_1 \subseteq A_2 \subseteq A_3 \dots$

a) $\bigcup_{i=1}^n A_i = A_n = \{\dots, -2, -1, 0, 1, \dots, n\}$

b) $\bigcap_{i=1}^n A_i = A_1 = \{\dots, -2, -1, 0, 1\}$

58. a) 00 1110 0000

b) 10 1001 0001

c) 01 1100 1110

62. $(A - B) \cup (B - A)$

$(x \in A \text{ but } x \notin B) \text{ or } (x \in B \text{ but } x \notin A)$