TD n°3 HAO 102

Exercice 1

1) $(A \cap B) \cup (C \cap B)$?

$A \cap B = \{4\}$ $C \cap B = \{3, 5\}$ $(A \cap B) \cup (C \cap B) = \{3, 4, 5\}$

2) $(A \cup C) \cap (B \cup D)$?

$(A \cup C) = \{1, 2, 3, 4, 5, 7\}$ $(B \cup D) = \{4, 5, 6, 7, 2, 3\}$

$(A \cup C) \cap (B \cup D) = \{2, 3, 4, 5, 7\}$

3) $(C_E A \cap D) \cap C_E (B \cup C)$

$C_E A = \{5, 6, 7\}$ $(C_E A \cap B) = \{5, 6\}$

$(B \cup C) = \{4, 5, 6, 1, 3, 4\}$ $C_E (B \cup C) = \{2\}$

$(C_E A \cap D) \cap C_E (B \cup C) = \{\emptyset\}$

2)

a. → B et D ne sont pas disjoints car $B \cap D \neq \emptyset$ ($4 \in B \cap D$)

→ B et D sont distincts car $B \neq D$ ($7 \in B$ et $7 \notin D$)

b. → B et C ne sont pas disjoints car $B \cap C \neq \emptyset$ ($7 \in B \cap C$)

→ B et C sont distincts car $B \neq C$ ($4 \in B$ et $4 \notin C$)

Exercice 2:

2) $\text{card}(A) = 3$ $\text{card}(E) = 3$

$\text{card}(B) = 2$ $\text{card}(F) = 2$

$\text{card}(C) = 1$ $\text{card}(G) = 3$

$\text{card}(D) = 5$ $\text{card}(H) = 3$

1)

$A=A$	$B=B$	$C=C$	$D=D$	$E=E$	$F=F$	$G=G$	$H=H$
$A=E$	$B \subset B$	$C \subset C$	$D \subset D$	$E=A$	$F \subset F$	$G \subset G$	$H \subset H$
$A \subset A$	$B \subset G$			$E \subset E$	$F \subset G$		
$A \subset D$				$E \subset D$			
$A \subset E$				$E \subset A$			

3) $A \cap B = \{5\}$

$G \cup H = \{\{1,2\}, \{5\}, 5, \{1, \{2\}\}\}$

$E \setminus G = \{1,2\}$

4) $A \subset D =$

$C_D^n = \{0, \emptyset\}$

Exercice 3

$E = \{a, b, c\}$

1) $\mathcal{P}(\{a\}) = \{\emptyset, \{a\}\}$

$\mathcal{P}(\{a,b,c\}) = \{\emptyset, \{a\}, \{b\}, \{c\}, \{a,b\}, \{b,c\}, \{c,a\}, \{a,b,c\}\}$

$\mathcal{P}(\{a,b\}) = \{\emptyset, \{a\}, \{b\}, \{a,b\}\}$

$\mathcal{P}(\mathcal{P}\{a,b\}) = \{\emptyset, \{\emptyset\}, \{\{a\}\}, \{\{b\}\}, \{\{a,b\}\}, \{\emptyset, \{a\}\}$

$\{\emptyset, \{b\}\}, \{\emptyset \{a,b\}\}, \{\{a\}, \{b\}\}, \{\{a\}, \{a,b\}\}, \{\{b\}, \{a,b\}\}$

$\{\emptyset, \{a\}, \{b\}\}, \{\emptyset, \{a\}, \{a,b\}\}, \{\emptyset, \{b\}, \{a,b\}\}$

$\{\{a\}, \{b\}, \{a,b\}\}, \{\emptyset, \{a\}, \{b\}, \{a,b\}\}\}$

2) $\mathcal{P}\{\emptyset\} = \{\emptyset\}$

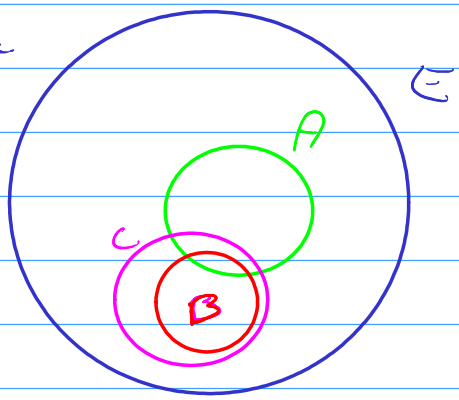
$\mathcal{P}(\mathcal{P}\{\emptyset\}) = \{\emptyset, \{\emptyset\}\}$

$\mathcal{P}(\mathcal{P}(\mathcal{P}\{\emptyset\})) = \{\emptyset, \{\emptyset\{\{\emptyset\}\}, \{\emptyset, \{\emptyset\}\}\}$

Exercice 5 :

1) $(A \cup B = A \cup C) \Rightarrow (B = C)$ est Faux

$[A \cup B = A \cup C$ et $B \neq C]$ est Vrai



$A = \{1, 2, 3, 4, 5, 6\}$

$B = \{5, 6, 7, 8\}$

$C = \{4, 5, 6, 7, 8\}$

$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8\}$
$A \cup C = \{1, 2, 3, 4, 5, 6, 7, 8\}$
} Donc $A \cup B = A \cup C$

et $B \neq C$ car $4 \in C$ et $4 \notin B$

$A = \{1\}$

$B = \{2\}$

$C = \{1, 2\}$

$A \cup B = \{1, 2\}$

$A \cup C = \{1, 2\}$