一. 1. $\{\phi, \{a\}, \{\{a\}\}, \{a, \{a\}\}\} = P(\{a, \{a\}\})$

2. $\{\phi, \{a\}, \{\{a\}\}, \{\phi, a\}, \{\phi, \{a\}\}, \{a, \{a\}\}, \{\phi, a, \{a\}\}\} = P(\{\phi, a, \{a\}\})$

3. $P(\{1,2,3,4\}) = \{\phi, \{1\}, \{2\}, \{3\}, \{4\}, \{1,2\}, \{1,3\}, \{1,4\}, \{2,3\}, \{2,4\}, \{3,4\}, \{1,2,3\}, \{1,2,4\}, \{2,3,4\}, \{1,2,3,4\}\}$

二. $A \times B = \{\langle 0,1\rangle, \langle 1,2\rangle, \langle 0,2\rangle, \langle 1,1\rangle\}$

$A^2 \times B = \{\langle 0,0,1\rangle, \langle 0,1,1\rangle, \langle 1,0,1\rangle, \langle 1,1,1\rangle, \langle 0,0,2\rangle, \langle 0,1,2\rangle, \langle 1,0,2\rangle, \langle 1,1,2\rangle\}$

$B \times A = \{\langle 1,0\rangle, \langle 1,1\rangle, \langle 2,0\rangle, \langle 2,1\rangle\}$

三. (1)(2): 不正确 B中包含$\{A\}$元素. 且为C的子集, 故 $A \in C$

(3)(4): 均正确 B以A作为子集, B为C中的一个元素. ∴ A为C中一个元素.

四. 1. $A \cap (B - C) \Rightarrow \{x \mid x \in A \wedge (x \in B \wedge x \notin C)\} \Rightarrow \{x \mid (x \in A \wedge x \in B) \wedge (x \in A \wedge x \notin C)\}$

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

$\Rightarrow A$

∴ 成立.

∴ QED

2. $(A-B)-C = A-(B \cup C)$.

$(A-B)-C \equiv A - B \cap \bar{C} \equiv \overline{A-B} \cup C \equiv \overline{A \cap \bar{B}} \cup C \equiv \bar{A} \cup B \cup C \equiv A-(B \cup C)$