Hw

Exercise 1: What is the relation between A and B if: $2^A \subseteq 2^B$

If $2^A \subseteq 2^B$

$\therefore 2^B = \{2^A, \dots\}$

$\therefore A \subseteq B$

Exercise 2:

a) for all $a \in A$, $a \in B$, $a \in C$

$\therefore$ for all $a \in A$, $a \in B \cap C$

$\therefore A \subset B \cap C$

Exercise 3:

a) for all $a \in A$, $a \in B$

for all $a \in B$, $a \in C$

$\therefore$ for all $a \in A$, $a \in C$

b) let $A = \{1\}$, $B = \{\{1\}\}$ $C = \{\{\{1\}\}\}$

$\{1\} \in \{\{\{1\}\}\}$ is false

$\therefore$ b) is not true

Exercise 4:

a) $m \geq |A \cap B| \geq 0$

$\uparrow$ $A \subseteq B$ $\quad$ $\uparrow$ no common elements

b) $m + n \geq |A \cup B| \geq m$

$\uparrow$ Completely diff. sets $\quad$ $\uparrow$ same set

Ex 4 c) $m \geq |A \setminus B| \geq m-n$

nothing removed $B \subseteq A$

d) $2^m = |A \cup 2^A|$

$A \subseteq 2^A \therefore |A \cup 2^A| = |2^A|$

Exercise 5:

a) $X \cap Y$

b) $X \cup Y$

c) $T / (X \cup Y)$

Exercise 6:

Let $a_0 = \{\emptyset\}$, $a_1 = \{\{\emptyset\}\}$, ... $a_n = \{\{ ... \emptyset \} ... \}$

and $a_{0 \to n} \in A$

Then this holds through for all cardinalities

Exercise 7

a) i) $\emptyset$

ii) N (because $n_1, n_2 \in N$ $n_1 + n_2 \in N$

iii) N^+

iv) N^+

d) $P \oplus P = \{ ... \}$

?

b) $E \otimes E$ $(4 = 6E)$ $(2 \times 2$ for $4)$

$E \otimes E \otimes E$ $(2^3 = 2 \cdot 2)$

c) $(S \oplus S) \cap S = Z$ $(s_1^2 + s_2^2 = z \in Z)$

$x^2 + y^2$ $= s_3$