1. Tautology test

$[(A \wedge B) \rightarrow C] \wedge B \wedge C' \rightarrow (A \rightarrow C)$

$P \rightarrow Q$

A	B	C	P	Q
T	T	T	F	T
T	T	F	F	F
T	F	T	F	T
T	F	F	F	F
F	T	T	F	T
F	T	F	T	T
F	F	T	F	T
F	F	F	F	T

is a tautology

Section II

2. $S(x) \rightarrow x$ is Something

$C(x) \rightarrow x$ is Cats ~~eats~~

$et(x) \rightarrow x$ is eat

$A(x) \rightarrow x$ is animals

$f(x) \rightarrow x$ is fuzzy

$ex(x) \rightarrow x$ is exist

$(\forall x)[[(C(x) \wedge et(x)) \rightarrow A(x)] \wedge$

$(\exists x)[f(x) \rightarrow ex(x)] \wedge (\forall(x)[f(x) \rightarrow C(x)]$

$\wedge (\forall x)[et(x) \rightarrow (\exists x)] \rightarrow \forall x[A(x) \rightarrow$

$ex.(x)]$

4

A. $x \in N$

$= \{5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38\}$

B. $x \in Z_{-3}$

$= \{-3, -2, 1, 2\}$.

C. $x \in N$

$= \{1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 30, 36, 40, 45, 48, 60, 72, 80, 90, 120, 144, 180, 240, 360, 720\}$

6.

~~a. 5842~~

~~b. 26~~

A. $|P(A)| = 2^{27}$

$= 134217728$

B. $|A \cup B \cup C| = 30$

C. $|(B \cup C) - (B \cap C)| = 12$

S= {1,2,3,4,5,6,7,8,9,10} S-B = 3,6,9

B= {1,2,4,5,7,8,10}

C = {2,3,5,7}

A = {2,4,6,8,10},

a= {2,3}, {2,6}, {2,9}, {4,3}, {4,6}, {4,9},
{6,3}, {6,6}, {6,9}, {8,3}, {8,6}, {8,9}
{10,3} {10,6}, {10,9},

b: {2} {3} {5} {7}, {2,3} {2,3,5}
{3,5}, {3,5,7}, {5,7}, {5,7,2},
{7,2}, {7,3,2}, {2,3,5,7} {0}
{5,2} {7,3}

c. (A ∩ C) = {2}

$\overline{A \cap C}$ = 1,3,4,5,6,7,8,9,10.