Maths Assignment 1

1. $\overline{A \cap \bar{B}}$ =

A \ B	1	1
0	1	1

$\bar{A} \cup B$ (c) =

A \ B	1	1
0	1	1

$\therefore$ part (c) = $\overline{A \cap \bar{B}} = \bar{A} \cup B$

2 $X \gg Y = \bar{X} \cup Y$

(a) $A \gg B = \overline{A \cap \bar{B}}$

A \ B	1	1
0	1	1

=

A \ B	1	1
0	1	1

$\therefore A \gg B = \overline{A \cap \bar{B}}$

(b) $(A \cap B) \gg C = A \gg (B \gg C)$

$(A \cap B)$ =

A \ B, C	0	0	0	0
0	0	0	1	1

$(B \gg C)$ =

A \ B, C	1	1	1	0
1	1	1	0	

$(A \cap B) \gg C$ =

A \ B, C	1	1	1	1
1	1	1	0	

$A \gg (B \gg C)$ =

A \ B, C	1	1	1	1
1	1	1	0	

$\therefore (A \cap B) \gg C = A \gg (B \gg C)$

(c) $A \gg (B \gg C) = (A \gg B) \gg C$

$(B \gg C) =$

A \ B	1	1	1	0
1	1	1	1	0

C

$\neq (A \gg B) =$

A \ B	1	1	1	1
0	0	1	1

C

$A \gg (B \gg C) =$

A \ B	1	1	1	1
1	1	1	1	0

C

$\neq (A \gg B) \gg C =$

0	1	1	0
1	1	1	0

$\therefore A \gg (B \gg C) \neq (A \gg B) \gg C$

3. Spanish = 44 total = 139

French = 63

German = 91

$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$

$139 = 44 + 63 + 91 - 23 - 21 - 25 + x$

$x = 10$

$\therefore$ 10 students speak all 3 languages

4(a) $a = 0001\ 1100$ $A = \{3, 4, 5\}$

$b = 0101\ 0010$ $B = \{1, 3, 6\}$

(b) $A \cap B = 0001\ 0000$

$A \cup B = 0101\ 1110$

(c) $A \oplus B = (A \cap \bar{B}) \cup (\bar{A} \cap B)$

$[0000\ 1100] \cup [0100\ 0010]$

$A \oplus B = 0100\ 1110$