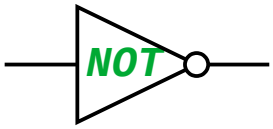
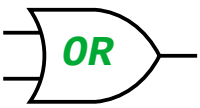
Boolean Algebra – Worksheet 1

1. Write the name of each logic gate inside the gate (AND, NAND, NOR, NOT, OR, XNOR, XOR)

a) 

b) 

c) 

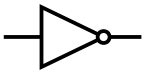
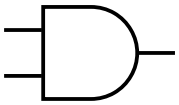
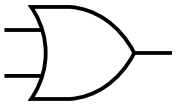
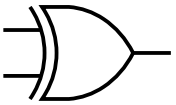
d) 

e) 

f) 

g) 

2. Fill in the table.

				
gate name	NOT	AND	OR	XOR
set notation	′	∩	∪	
logic symbol	¬	∧	∨	⊻
Java bitwise operator	~	&	|	^

2. Fill in the truth table.

		AND	NAND	OR	NOR	XOR	XNOR
0	0	0	1	0	1	0	1
0	1	0	1	1	0	1	0
1	0	0	1	1	0	1	0
1	1	1	0	1	0	0	1

3. Complete the following truth tables.

a)

A	B	$\neg A$	$\neg B$	$\neg A \wedge \neg B$	$\neg(\neg A \wedge \neg B)$	$A \vee B$
0	0	1	1	1	0	0
0	1	1	0	0	1	1
1	0	0	1	0	1	1
1	1	0	0	0	1	1

b)

A	B	$\neg A$	$\neg B$	$\neg A \vee \neg B$	$\neg(\neg A \vee \neg B)$	$A \wedge B$
0	0	1	1	1	0	0
0	1	1	0	1	0	0
1	0	0	1	1	0	0
1	1	0	0	0	1	1

c) Note that the final two columns of each table show **De Morgan's Laws**. Write these two equivalencies below:

$\neg(\neg A \wedge \neg B) = A \vee B$

$\neg(\neg A \vee \neg B) = A \wedge B$