

## Digital Circuits Exam 2 Cheat Sheet by jjlondon via cheatography.com/69385/cs/17506/

Boolean Algebra Rules	
A + 0 = A	
A + 1 = 1	
A x 0 = 0	
$A \times 1 = A$	
A + A = A	
A + A' = 1	
$A \times A = A$	
$A \times A' = 0$	
A'' = A	
A + A'B = A + B	
A + AB = A(1+B) = A(1) = A	
(A+B)(A+C) = A+BC	
A + B = B + A	
AB = BA	
A+B+C = A+(B+C)	
A(B+C) = AB+AC	

Laws	
Communative Law	$A \times B = B \times A$
	A + B = B + A
Associative Law	$A \times (B \times C) = (A \times B) \times C$
	A + (B + C) = (A + B) + C
Distributive Law	$A \times (B + C) = A \times B + A \times C$
	$A + B \times C = (A+B)(A+C)$

DeMorgan Rules
(AB)' = A' + B'
(A+B)' = A'B'
$Y' = A' \times B \times C$
$Y = (A' \times B \times C)'$
$Y = A \times B' \times C'$
$(A \times B \times C)' = A' + B' + C'$
$(A + B + C)' = A' \times B' \times C'$

Theorems	
Theorem 1	$X + X \cdot Y = X$
Theorem 2	$X + X' \cdot Y = X + Y$
Theorem 3	$X \cdot Y + X' \cdot Z + Y \cdot Z = X \cdot Y + X' \cdot Z$
Theorem 4	X(X + Y) = X
Theorem 5	$X(X' + Y) = X \cdot Y$
Theorem 6	(X + Y)(X + Y') = X
Theorem 7	$(X+Y)(X'+Z)=X\cdot Z+X'\cdot Y$
Theorem 8	(X + Y)(X' + Z)(Y + Z) = (X + Y)(X' + Z)

## Binary & Gray Code

Decimal numbers	Binary code	Gray code
0	0000	0000
1	0001	0001
2	0010	0011
3	0011	0010
4	0100	0110
5	0101	0111
6	0110	0101
7	0111	0100
8	1000	1100
9	1001	1101
10	1010	1111
11	1011	1110
12	1100	1010
13	1101	1011
14	1110	1001
15	1111	1000



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