Laws of Boolean Algebra Cheat Sheet

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Identities

0 + X = X
0 · X = 0
1 + X = 1
1 · X = X
X + X = X
X · X = X

Negation

X + ~X = 1
~0 = 1
~1 = 0
~~X = X
X · ~X = 0

Laws

Communative Law	A · B = B · A
	A + B = B + A
Associative Law	A · (B · C) = (A · B) · C
	A + (B + C) = (A + B) +C
Distributive Law	A · (B + C) = A·B + A·C
	A + B · C = (A+B)(A+C)

De Morgan's Laws

~(X · Y)	= X + Y
~(X + Y)	= X . Y
~(X · Y · Z)	= X + Y + ~Z
~(X + Y + Z)	= X . Y · ~Z

Theorems

Theorem 1

X + X · Y = X

Theorem 2

X + ~X · Y = X + Y

Theorem 3

X · Y + X · Z + Y · Z = X · Y + X · Z

Theorem 4

X(X + Y) = X

Theorem 5

X(~X + Y) = X · Y

Theorem 6

(X + Y)(X + ~Y) = X

Theorem 7

(X + Y)(X + Z) = X · Z + X · Y

Theorem 8

(X + Y)(X + Z)(Y + Z) = (X + Y)(X + Z)

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