Operator Definitions

Operations are defined on the values 0 and 1 for each operator:

AND	OR	NOT
$0 \cdot 0 = 0$	$0 + 0 = 0$	$\bar{0} = 1$
$0 \cdot 1 = 0$	$0 + 1 = 1$	$\bar{1} = 0$
$1 \cdot 0 = 0$	$1 + 0 = 1$	
$1 \cdot 1 = 1$	$1 + 1 = 1$	

Order of Evaluation / Precedence

1. Parentheses
2. NOT
3. AND
4. OR

Basic Identities of Boolean Algebra

Identity Laws:

1. $X + 0 = X$
2. $X \cdot 1 = X$

Annulment Laws:

3. $X + 1 = 1$
4. $X \cdot 0 = 0$

Idempotent Laws:

5. $X + X = X$
6. $X \cdot X = X$

Complement Laws:

7. $X + \bar{X} = 1$
8. $X \cdot \bar{X} = 0$

Double Negation Law:

9. $\bar{\bar{X}} = 0$

Commutative Laws:

10. $X + Y = Y + X$
11. $X \cdot Y = Y \cdot X$

Distributive Laws:

12. $X \cdot (Y + Z) = X \cdot Y + X \cdot Z$
13. $X + (Y \cdot Z) = (X + Y) \cdot (X + Z)$

Associative Laws:

14. $X + (Y + Z) = (X + Y) + Z = X + Y + Z$
15. $X \cdot (Y \cdot Z) = (X \cdot Y) \cdot Z = X \cdot Y \cdot Z$

DeMorgan's Laws:

16. $\overline{X + Y} = \bar{X} \cdot \bar{Y}$
17. $\overline{X \cdot Y} = \bar{X} + \bar{Y}$

Absorptive Laws:

18. $X + (X \cdot Y) = X$
19. $X \cdot (X + Y) = X$

Dual

The dual is obtained by interchanging + and · and interchanging 0's and 1's.

A self-dual means the dual of the expression is equal to the original expression