Basic Identities of Boolean Algebra

1.	X + 0	=	X	2.	X · 1	=	X
3.	X + 1	=	1	4.	X · 0	=	0
5.	X + X	=	X	6.	X · X	=	X
7.	X + X’	=	1	8.	X · X’	=	0
9.	(X’)’	=	X				
10.	X + Y	=	Y + X	11.	XY	=	YX
12.	X + (Y + Z)	=	(X + Y) + Z	13.	X(YZ)	=	(XY)Z
14.	X(Y + Z)	=	XY + XZ	15.	X + YZ	=	(X + Y)(X + Z)
16.	(X+Y)’	=	X’ · Y’	17.	(X·Y)’	=	X’ + Y’

Note: 10-11 are referred to as commutative laws
12-13 are referred to as associative laws
14-15 are referred to as distributive laws
16-17 are referred to as DeMorgan’s theorem

Consensus Theorem

	XY + X’Z + YZ	= XY + X’Z
(dual)	(X + Y)(X’ + Z)(Y + Z)	= (X + Y)(X’ + Z)

Minterm: a product term in which all the variables appear exactly once, either complemented or uncomplemented; represents exactly one combination of the binary variables in a truth table (a function, not equal to 0, having the minimum number of 1’s in its truth table).

Maxterm: a sum term that contains all the variables in complemented or uncomplemented form (a function, not equal to 1, having the maximum of 1’s in its truth table).

Properties of minterms

1. There are 2^n minterms for n Boolean variables. These minterms can be evaluated from the binary numbers from 0 to $2^n – 1$.
2. Any Boolean function can be expressed as a logical sum of minterms.
3. The complement of a function contains those minterms not included in the original function.
4. A function that includes all the 2^n minterms is equal to logic 1.