

Basic identities of Boolean Algebra

Identity:

$$1. X + 0 = X$$

$$2. X * 1 = X$$

Null Elements:

$$3. X + 1 = 1$$

$$4. X * 0 = 0$$

Idempotent Law:

$$5. X + X = X$$

$$6. X * X = X$$

Complement:

$$7. X + X' = 1$$

$$8. X * X' = 0$$

Involution Law:

$$9. X'' = X$$

Commutative:

$$10. X + Y = Y + X$$

$$11. X * Y = Y * X$$

Associative:

$$12. X + (Y + Z) = (X + Y) + Z$$

$$13. X * (Y * Z) = (X * Y) * Z$$

Distributive:

$$14. X * (Y + Z) = X * Y + X * Z$$

$$15. X + Y * Z = (X + Y) * (X + Z)$$

DeMorgan's Law:

$$16. (X + Y)' = X' * Y'$$

$$17. (X * Y)' = X' + Y'$$

Covering Theorem:

$$18. X + X * Y = X$$

$$19. X * (X + Y) = X$$

Combining Theorem:

$$20. X * Y + X * Y' = X$$

$$21. (X + Y) * (X + Y') = X$$

Consensus Theorem:

$$22. X * Y + X' * Z + Y * Z = X * Y + X' * Z$$

$$23. (X + Y) * (X' + Z) * (Y + Z) = (X + Y) * (X' + Z)$$