

Truth Tables

Conjunction: $p \wedge q$

p	q	$p \wedge q$
T	T	T
T	F	F
F	T	F
F	F	F

Disjunction: $p \vee q$

p	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

Negation: $\sim p$

p	$\sim p$
T	F
F	T

Implication: $p \Rightarrow q$

p	q	$p \Rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

Related:

Converse: $q \Rightarrow p$ Inverse: $\sim p \Rightarrow \sim q$ Contrapositive: $\sim q \Rightarrow \sim p$ Biconditional: $p \Leftrightarrow q$

p	q	$p \Leftrightarrow q$
T	T	T
T	F	F
F	T	F
F	F	T

Exclusive Or: $p \oplus q$

p	q	$p \oplus q$
T	T	F
T	F	T
F	T	T
F	F	F

Laws

Double Negation Law

$$\sim(\sim p) \equiv p$$

Identity Laws

$$p \vee F \equiv p$$

$$p \wedge T \equiv p$$

Idempotent Laws

$$p \vee p \equiv p$$

$$p \wedge p \equiv p$$

Annihilation Laws

$$p \vee T \equiv T$$

$$p \wedge F \equiv F$$

Commutative Laws

$$p \vee q \equiv q \vee p$$

$$p \wedge q \equiv q \wedge p$$

Associative Laws

$$p \vee (q \vee r) \equiv (p \vee q) \vee r$$

$$p \wedge (q \wedge r) \equiv (p \wedge q) \wedge r$$

Distributive Laws

$$p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$$

$$p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$$

Absorption Laws

$$p \vee (p \wedge q) \equiv p$$

$$p \wedge (p \vee q) \equiv p$$

De Morgan's Laws

$$\sim(p \vee q) \equiv \sim p \wedge \sim q$$

$$\sim(p \wedge q) \equiv \sim p \vee \sim q$$