

Laws of Logic

1	$\neg\neg p \Leftrightarrow p$	Double Negation
2	$\neg(p \vee q) \Leftrightarrow \neg p \wedge \neg q$ $\neg(p \wedge q) \Leftrightarrow \neg p \vee \neg q$	Demorgan
3	$p \vee q \Leftrightarrow q \vee p$ $p \wedge q \Leftrightarrow q \wedge p$	Commutativity
4	$p \vee (q \vee r) \Leftrightarrow (p \vee q) \vee r$ $p \wedge (q \wedge r) \Leftrightarrow (p \wedge q) \wedge r$	Associativity
5	$p \vee (q \wedge r) \Leftrightarrow (p \vee q) \wedge (p \vee r)$ $p \wedge (q \vee r) \Leftrightarrow (p \wedge q) \vee (p \wedge r)$	Distributivity
6	$p \vee q \Leftrightarrow p$ $p \wedge p \Leftrightarrow p$	Idempotence Idempotence
7	$p \vee F_0 \Leftrightarrow p$ $p \wedge T_0 \Leftrightarrow p$	Identity
8	$p \vee \neg p \Leftrightarrow T_0$ $p \wedge \neg p \Leftrightarrow F_0$	Inverse
9	$p \vee T_0 \Leftrightarrow T_0$ $p \wedge F_0 \Leftrightarrow F_0$	Domination
10	$p \vee (p \wedge q) \Leftrightarrow p$ $p \wedge (p \vee q) \Leftrightarrow p$	Absorption

Rules of Inference

	Premises	Conclusion	Name
1	$p \wedge (p \rightarrow q)$	q	Modus Ponens
2	$(p \rightarrow q) \wedge (q \rightarrow r)$	$p \rightarrow r$	Syllogism
3	$(p \rightarrow q) \wedge \neg q$	$\neg p$	Modus Tollens
4	$(p) \wedge (q)$	$p \wedge q$	Conjunction
5	$(p \vee q) \wedge \neg p$	q	Disjunctive Syllogism
6	$(\neg p \rightarrow F_0)$	p	Contradiction
7	$p \wedge q$	p	Conjunctive Simplification
8	p	$p \wedge q$	Disjunctive Amplification
9	$(p \wedge q) \wedge [p \rightarrow (q \rightarrow r)]$	r	Conditional Proof
10	$(p \rightarrow r) \wedge (q \rightarrow r)$	$(p \vee q) \rightarrow r$	Proof by cases
11	$(p \rightarrow q) \wedge (r \rightarrow s) \wedge (p \vee r)$	$q \vee s$	Constructive Dilemma
12	$(p \rightarrow q) \wedge (r \rightarrow s) \wedge (\neg q \vee \neg s)$	$(\neg p \vee \neg r)$	Destructive Dilemma