Laws of Logic

1. $\neg\neg p \leftrightarrow p$	Law of Double Negation
2. $\neg(p \vee q) \leftrightarrow \neg p \wedge \neg q$ $\neg(p \wedge q) \leftrightarrow \neg p \vee \neg q$	DeMorgan's Law
3. $p \vee q \leftrightarrow q \vee p$ $p \wedge q \leftrightarrow q \wedge p$	Commutative Laws
4. $p \vee (q \vee r) \leftrightarrow (p \vee q) \vee r$ $p \wedge (q \wedge r) \leftrightarrow (p \wedge q) \wedge r$	Associative Laws
5. $p \vee (q \wedge r) \leftrightarrow (p \vee q) \wedge (p \vee r)$ $p \wedge (q \vee r) \leftrightarrow (p \wedge q) \vee (p \wedge r)$	Distributive Laws
6. $p \vee p \leftrightarrow p$ $p \wedge p \leftrightarrow p$	Idempotent Laws
7. $p \vee F \leftrightarrow p$ $p \wedge T \leftrightarrow p$	Identity Laws
8. $p \vee \neg p \leftrightarrow T$ $p \wedge \neg p \leftrightarrow F$	Inverse Laws
9. $p \vee T \leftrightarrow T$ $p \wedge F \leftrightarrow F$	Domination Laws
10. $p \vee (p \wedge q) \leftrightarrow p$ $p \wedge (p \vee q) \leftrightarrow p$	Absorption Laws
11. $(p \rightarrow q) \leftrightarrow (\bar{p} \vee q)$	Implication Identity
12. $(p \rightarrow q) \leftrightarrow (\bar{q} \rightarrow \bar{p})$	Contrapositive

Laws of Set Theory

1. $\bar{\bar{A}} = A$	Law of Double Negation
2. $\overline{A \cup B} = \bar{A} \cap \bar{B}$ $\overline{A \cap B} = \bar{A} \cup \bar{B}$	DeMorgan's Laws
3. $A \cup B = B \cup A$ $A \cap B = B \cap A$	Commutative Laws
4. $A \cup (B \cup C) = (A \cup B) \cup C$ $A \cap (B \cap C) = (A \cap B) \cap C$	Associative Laws
5. $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$	Distributive Laws
6. $A \cup A = A$ $A \cap A = A$	Idempotent Laws
7. $A \cup \emptyset = A$ $A \cap \mathcal{U} = A$	Identity Laws
8. $A \cup \bar{A} = \mathcal{U}$ $A \cap \bar{A} = \emptyset$	Inverse Laws
9. $A \cup \mathcal{U} = \mathcal{U}$ $A \cap \emptyset = \emptyset$	Domination Laws
10. $A \cup (A \cap B) = A$ $A \cap (A \cup B) = A$	Absorption Laws

Rules of Inference

1. $[p \wedge (p \to q)] \to q$	Rule of Detachment (Modus Ponens)
2. $[(p \to q) \wedge (q \to r)] \to (p \to r)$	Law of Syllogism
3. $[(p \to q) \wedge \neg q] \to \neg p$	Modus Tollens
4. $[(p) \wedge (q)] \to p \wedge q$	Rule of Conjunction
5. $[(p \vee q) \wedge \neg p] \to q$	Rule of Disjunctive Syllogism
6. $(\neg p \to F) \to p$	Rule of Contradiction
7. $(p \wedge q) \to p$	Rule of Conjunctive Simplification
8. $p \to (p \vee q)$	Rule of Disjunctive Amplification
9. $[(p \wedge q) \wedge [p \to (q \to r)]] \to r$	Rule of Conditional Proof
10. $[(p \to r) \wedge (q \to r)] \to [(p \vee q) \to r]$	Rule for Proof by Cases
11. $[(p \to q) \wedge (r \to s) \wedge (p \vee r)] \to (q \vee s)$	Rule of the Constructive Dilemma
12. $[(p \to q) \wedge (r \to s) \wedge (\neg q \vee \neg s)] \to (\neg p \vee \neg r)$	Rule of the Destructive Dilemma

Sequence and Series Terms and Sums

Arithmetic Sequences: $a_n = a_1 + (n-1)d$, $a_j = a_i + (j-i)d$, $S_n = \frac{(a_1+a_n)n}{2}$

Geometric Sequences: $a_n = a_1 r^{n-1}$, $a_j = a_i r^{j-i}$, $S_n = \frac{a_1(1-r^n)}{1-r}, r \neq 1$, $S_\infty = \frac{a_1}{1-r}, |r| < 1$

Sum Formulas: $\sum_{i=1}^{n} c = cn$ $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$, $\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$, $\sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}$