

TAUTOLOGIES

Tautological Statements

$P \vee \sim P$	Excluded Middle
$\sim (P \wedge \sim P)$	Noncontradiction

Equivalencies

$(P \vee P) \cong P$	Idempotence
$(P \wedge P) \cong P$	Idempotence
$[P \wedge (P \vee Q)] \cong P$	Absorption
$[P \vee (P \wedge Q)] \cong P$	Absorption
$\sim (\sim P) \cong P$	Double Negation
$(P \vee Q) \cong (Q \vee P)$	Commutativity of \vee
$(P \wedge Q) \cong (Q \wedge P)$	Commutativity of \wedge
$(P \Leftrightarrow Q) \cong (Q \Leftrightarrow P)$	Commutativity of \Leftrightarrow
$[P \vee (Q \vee R)] \cong [(P \vee Q) \vee R]$	Associativity of \vee
$[P \wedge (Q \wedge R)] \cong [(P \wedge Q) \wedge R]$	Associativity of \wedge
$[P \Leftrightarrow (Q \Leftrightarrow R)] \cong [(P \Leftrightarrow Q) \Leftrightarrow R]$	Associativity of \Leftrightarrow
$[P \wedge (Q \vee R)] \cong [(P \wedge Q) \vee (P \wedge R)]$	Distributivity of \wedge over \vee
$[P \vee (Q \wedge R)] \cong [(P \vee Q) \wedge (P \vee R)]$	Distributivity of \vee over \wedge
$[P \Rightarrow (Q \vee R)] \cong [(P \Rightarrow Q) \vee (P \Rightarrow R)]$	Distributivity of \Rightarrow over \vee
$[P \Rightarrow (Q \wedge R)] \cong [(P \Rightarrow Q) \wedge (P \Rightarrow R)]$	Distributivity of \Rightarrow over \wedge
$\sim (P \wedge Q) \cong (\sim P \vee \sim Q)$	DeMorgan's Law
$\sim (P \vee Q) \cong (\sim P \wedge \sim Q)$	DeMorgan's Law
$(P \Leftrightarrow Q) \cong [(P \Rightarrow Q) \wedge (Q \Rightarrow P)]$	Equivalence
$(P \Leftrightarrow Q) \cong [(P \wedge Q) \vee (\sim P \wedge \sim Q)]$	Equivalence
$(P \Leftrightarrow Q) \cong (\sim P \Leftrightarrow \sim Q)$	Equivalence
$(P \Rightarrow Q) \cong (\sim P \vee Q)$	Conditional Disjunction
$\sim (P \Rightarrow Q) \cong (P \wedge \sim Q)$	Negation of Conditional
$\sim (P \Leftrightarrow Q) \cong (\sim P \Leftrightarrow Q)$	Negation of Biconditional
$(P \Rightarrow Q) \cong (\sim Q \Rightarrow \sim P)$	Contraposition
$[P \Rightarrow (Q \Rightarrow R)] \cong [(P \wedge Q) \Rightarrow R]$	Exportation

Implications

$[P \wedge (P \Rightarrow Q)] \Rightarrow Q$	Modus Ponens
$[(P \Rightarrow Q) \wedge (Q \Rightarrow R)] \Rightarrow (P \Rightarrow R)$	Syllogism
$[(P \Rightarrow Q) \wedge (\sim Q)] \Rightarrow \sim P$	Modus Tollens
$(P \Rightarrow Q) \Rightarrow [(R \wedge P) \Rightarrow (R \wedge Q)]$	Factorization
$(P \Rightarrow Q) \Rightarrow [(R \vee P) \Rightarrow (R \vee Q)]$	Summation
$[(P \vee Q) \wedge \sim P] \Rightarrow Q$	Disjunctive Syllogism
$[\sim P \Rightarrow (Q \wedge \sim Q)] \Rightarrow P$	Reductio Ad Absurdum
$\{[(P \Rightarrow R) \wedge (Q \Rightarrow S)] \wedge (P \vee Q)\} \Rightarrow (R \vee S)$	Dilemma