

Symbols	
$\neg$	NOT
$\vee$	OR
$\wedge$	AND
$\rightarrow$	IMPLIES
$\leftrightarrow$	EQUAL

Logical equivalences		
$\neg\neg p$	$\equiv$	p
$p \wedge q$	$\equiv$	$q \wedge p$
$p \vee q$	$\equiv$	$q \vee p$
$p \wedge (q \wedge r)$	$\equiv$	$(p \wedge q) \wedge r$
$p \vee (q \vee r)$	$\equiv$	$(p \vee q) \vee r$
$p \wedge p$	$\equiv$	p
$p \vee p$	$\equiv$	p
$p \wedge (q \vee r)$	$\equiv$	$(p \wedge q) \vee (p \wedge r)$
$p \vee (q \wedge r)$	$\equiv$	$(p \vee q) \wedge (p \vee r)$
$\neg(p \wedge q)$	$\equiv$	$\neg p \vee \neg q$
$\neg(p \vee q)$	$\equiv$	$\neg p \wedge \neg q$
$p \rightarrow q$	$\equiv$	$\neg p \vee q$
$p \rightarrow q$	$\equiv$	$\neg(p \wedge \neg q)$
$p \leftrightarrow q$	$\equiv$	$(p \rightarrow q) \wedge (q \rightarrow p)$
$p \rightarrow q$	$\equiv$	$\neg q \rightarrow \neg p$

Truth table						
p	q	$\neg p$	$p \vee q$	$p \wedge q$	$p \rightarrow q$	$p \leftrightarrow q$
T	T	F	T	T	T	T
T	F	F	T	F	F	F
F	T	T	T	F	T	F
F	F	T	F	F	T	T

Tautology
always true
$p \wedge (\text{a tautology}) \equiv p$
$p \vee (\text{a tautology})$ is a tautology
$\neg(\text{a tautology})$ is a contradiction

Contradiction
always false
$p \wedge (\text{a contradiction})$ is a contradiction
$p \vee (\text{a tautology}) \equiv p$
$\neg(\text{a contradiction})$ is a tautology

Quantifier	
$\forall$	for all
$\exists$	for some

