Logical Equivalences Involving Conditional Statements

$p \to q \equiv \neg p \vee q$

$\boxed{p \to q \equiv \neg q \to \neg p}$ Contrapositive

$p \vee q \equiv \neg p \to q$

$p \wedge q \equiv \neg(p \to \neg q)$

$\neg(p \to q) \equiv p \wedge \neg q$

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

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

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

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

$p \to q$ is $q \to p$ Converse

$p \to q$ is $\neg p \to \neg q$ inverse

$\boxed{p \to q \not\equiv p \to q}$