L4 25 Jan 2022

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$\neg[p \to (p \vee q)]$

p	q	$p \vee q$	$p \to (p \vee q)$	$\neg[p \to (p \vee q)]$
T	T	T	T	F
T	F	T	T	F
F	T	T	T	F
F	F	F	T	F

→ Contradiction

$(\neg q \wedge (p \to q)) \to \neg p$ is a

a) Contingency

~~b)~~ Tautology

c) Contradiction

d) None of these

p	q	$\neg q$	$p \to q$	$\neg q \wedge (p \to q)$	$\neg p$	$(\neg q \wedge (p \to q)) \to \neg p$
T	T	F	T	F	F	T
T	F	T	F	F	F	T
F	T	F	T	F	T	T
F	F	T	T	T	T	T

Tautology

If the proposition is always False for any truth value of its variable then that proposition is a

(a) Tautology (b) Contingency ~~(c)~~ Contradiction (d) None of the above

Logical Equivalence :→

P and Q are said to be logically Equivalent to each other if $P \leftrightarrow Q$ is a tautology

$\boxed{P \equiv Q}$

P :→ Good items are not cheap

p :→ Items are good

Q :→ Cheap items are not good.

If item is cheap then it is not

p :→ Items are good

q :→ Items are cheap

If the item is good then it is not cheap

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

If item is cheap then it is not good

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

Let us check for Logical Equivalence

p	q	¬q	¬p	p→¬q	q→¬p	(p→¬q) ↔ (q→¬p)
T	T	F	F	F	F	T
T	F	T	F	T	T	T
F	T	F	T	T	T	T
F	F	T	T	T	T	T

→ tautology

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

¬ (p ↔ q) is logically equivalent to:

a) q↔p

b) p↔¬q

c) ¬p↔¬q

d) ¬q↔¬p

$\neg(p \leftrightarrow q)$

p	q	¬p	¬q	¬(p↔q)	q↔p (A)	p↔¬q (B)	¬p↔¬q (C)	¬q↔¬p (D)
T	T	F	F	F	T	F	T	T
T	F	F	T	T	F	T	F	F
F	T	T	F	T	F	T	F	F
F	F	T	T	F	T	F	T	T

p → q is logically equivalent to:

(A) (B) (C)

$p \to q$ is logically equivalent to:

a) $\neg p \vee \neg q$
b) $p \vee \neg q$
c) $\neg p \vee q$
d) $\neg p \wedge q$

p	q	$p\to q$	$\neg p$	$\neg q$	(A) $\neg p \vee \neg q$	(B) $p \vee \neg q$	(C) $\neg p \vee q$
T	T	T	F	F	F	T	T
T	F	F	F	T	T	T	F
F	T	T	T	F	T	F	T
F	F	T	T	T	T	T	T

Converse, Inverse and Contrapositive of a Conditional proposition

$\boxed{p \to q}$

If p then q

Converse :- The statement $\boxed{q \to p}$ is called the Converse of the Conditional proposition.

Inverse :- The statement $\boxed{\neg p \to \neg q}$ is called the inverse of the statement.

Contrapositive :- The statement $\boxed{\neg q \to \neg p}$ is called the Contrapositive (Converse of the inverse statement)

"The home team wins whenever it is raining"

or

If $\underbrace{\text{it is raining}}_{p}$ then $\underbrace{\text{the home team wins}}_{q}$

Converse $q \to p$:- If the home team wins then it is raining.

Inverse :- $\neg p \to \neg q$:- If it is not raining then the home team doesnot wins.

Contrapositive $\neg q \to \neg p$:- If the home team does not wins then it is not raining.

not saming.