

1.7. Converse,

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Inverse, & Contrapositive

original
($p \rightarrow q$)

With any Conditional Statement.
There are 3 related Statements

Converse: formed by Switching
the order of p & q . ($q \rightarrow p$)

Inverse: formed by Negating^{opposite}
both p & q . ($\sim p \rightarrow \sim q$)

Contrapositive: formed by
Negating both p & q and
Switching the order. ($\sim q \rightarrow \sim p$)

ex) Original Statement.

"If Mr. G. teaches Science,
Then Mr. G. is a teacher."

Converse: "If Mr. G. is a teacher,
Then Mr. G. teaches Science."

Inverse: "If Mr. G. does Not teach Science,
Then Mr. G. is not a teacher."

Contrapositive: "If Mr. G. is Not a teacher,
Then Mr. G. does Not teach Science."

Truth Value: Do the Converse, Inverse, & Contrapositive of a statement, have the original Truth Value of that original statement? Consider the Prev. Example.

*Original: $F \rightarrow T = \underline{\underline{I}}$

Converse: $T \rightarrow F = \underline{\underline{F}}$

Inverse: $\sim F \rightarrow \sim T = T \rightarrow F = \underline{\underline{F}}$

*Contrapositive: $\sim T \rightarrow \sim F = F \rightarrow T = \underline{\underline{I}}$

Rule to Know:

- Original & Contrapositive Always have the Same Truth Value.
- Converse & Inverse could have the same Truth Value of the Original, but NOT Always

Helpful Chart

Conditional	Relation to original	Truth Value compared to original
$p \rightarrow q$	original	T or F
$q \rightarrow p$	Converse	Converse of True Conditional maybe T or F
$\sim p \rightarrow \sim q$	Inverse	Inverse of True Conditional maybe T or F
$\sim q \rightarrow \sim p$	Contrapositive	Always the same Truth Value as the original

O.T.L.

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