**Inverse: The inverse of a conditional statement is formed by negating the hypothesis and conclusion.~p---→ ~q.**

Conditional: If a number is a whole number, then it is an integer.

Inverse: If a number is not a whole number, then it is not an integer.

$\sim p \rightarrow \sim q$

Table:

| p | q | ~p | ~q | p → q | ~p → ~q |
|---|---|---|---|---|---|
| | | | | | |

**Converse: The converse of a conditional statement is formed by interchanging the hypothesis and the conclusion.**

$q \rightarrow p$

ex) Conditional: If a number is an whole number, then it is an integer.

Converse: If a number is an integer, then it is a whole number.

Table:

| p | q | p → q | q → p |
|---|---|---|---|
| | | | |

**Contrapositive: The contrapositive of a conditional is formed by the negating and interchanging the hypothesis and the conclusion.**

ex) Conditional: If a number is a whole number , then it is an integer .

$\sim q \rightarrow \sim p$

Contrapositive:If a number is not an integer, then it is not a whole number.

Table:

| p | q | ~p | ~q | p → q | ~q → ~p |
|---|---|---|---|---|---|
| | | | | | |

**Logically Equivalents:**

| | | | | Conditional | inverse | converse | contrapositive |
|---|---|---|---|---|---|---|---|
| p | q | ~p | ~q | p → q | ~p → ~q | q → p | ~q → ~p |
| T | T | F | F | T | T | T | T |
| T | F | F | T | F | T | T | F |
| F | T | T | F | T | F | F | T |
| F | F | T | T | T | T | T | T |

A conditional and its contrapositive always have the same truth value.
A conditional and its contrapositive are logically equivalent because they have the same truth values. What else does?

3. $p \to q$

| $p$ | $q$ | Cond $p \to q$ | Inver $\sim p \to \sim q$ | Conve $q \to p$ | Contrapositive $\sim q \to \sim p$ |
|---|---|---|---|---|---|
| T | T | T | T | T | T |
| T | F | F | T | T | F |
| F | T | T | F | F | T |
| F | F | T | T | T | T |