EQUIVALENCES WITH IMPLICATIONS

Negating a conditional

To deny "if p, then q" is to describe the cases in which it fails, and the truth table of p → q has exactly one such row.

01

NEGATED IMPLICATION — BEFORE

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

↓ Material implication — p → q ≡ ¬p ∨ q

02

NEGATED DISJUNCTION

$$\neg(\neg p \vee q)$$

↓ De Morgan's law — the negation goes inside and ∨ becomes ∧

03

DOUBLE NEGATION INSIDE

$$\neg\neg p \wedge \neg q$$

↓ Drop the double negation — ¬¬p ≡ p

04

A SINGLE CONJUNCTION

AFTER

$$p \wedge \neg q$$

NOT ANOTHER ARROW