**Special Cases for Translation**

CONSTRUCTION TRANSLATION

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neither p nor q

not either p or q ~(p v q) or

both p and q are not ~p • ~q

not p and not q

not both p and q ~(p • q) or

not p or not q ~p v ~q

p or q but not both (p v q) • ~(p • q)

p unless q p v q or

 ~q  p or

 ~p  q

if p then q

if p, q

p only if q p  q

p is sufficient for q

p implies q

p if q

p is necessary for q q  p

p is implied by q

For transformation of the conjunction and disjunction, see DeMorgan's Theorem:

 ~(p • q) ≡ (~p v ~q)

 ~(p v q) ≡ (~p • ~q)

For transformation of the conditional, see Contraposition:

 (p  q) ≡ (~q  ~p)

Exclusive disjunction (p v q) • ~(p • q)

Inclusive disjunction (p v q) • (p • q)