

Reit

= Elim, =Intro

**^ Elim**

**^ Intro p.145**

**∨ Elim p.151** (Proof by Cases), Last sentence in both cases must be the same.

**∨ Intro p.149**

$P \rightarrow Q$  (conditional) If P, then Q.

**→Elim p.207** 1.  $P \rightarrow Q$ , 2. P, then can conclude Q.

**→ Intro p.207** by having a subproof that starts with P and end with Q, then outside of subproof can state  $P \rightarrow Q$ .

$\leftrightarrow$  biconditional ... if and only if .... necessary and sufficient

**↔ Elim p. 210**, 1.  $P \leftrightarrow Q$ , 2. P... can conclude Q, or 1.  $P \leftrightarrow Q$ , 2. Q... can conclude P,

**↔ Intro p. 210** to conclude the sentence  $P \leftrightarrow Q$ : two subproofs ( $P \rightarrow Q$ ) and ( $Q \rightarrow P$ )

When your conclusion is a disjunction:  $P \vee Q$ . Use a Law of Excluded Middle.  $P \vee \sim P$  (Taut Con)

**⊥ Elim p.161**

**⊥ Intro p.157**

**¬ Elim p.156**

**¬Intro p. 157**

Contrapositive:  $P \rightarrow Q$  is tautologically equivalent to  $\sim Q \rightarrow \sim P$

**∀ Intro p. 352**

**∀ Elim p. 352**

**∃ Intro p. 357**

**∃ Elim p. 357**