

# Propositional Logic

## Gentzen's Natural Deduction Rules

### Intro

$$\frac{P \quad Q}{P \wedge Q} (\wedge_I)$$

$$\frac{\begin{array}{c} \neg \\ \vdots \\ Q \end{array}}{P \rightarrow Q} (\rightarrow_I)$$

$$\frac{P}{P \vee Q} (\vee_{L_i}) \quad \frac{Q}{P \vee Q} (\vee_{R_i})$$

### Elim

$$\frac{P \wedge Q}{P} (\wedge_{E_l}) \quad \frac{P \wedge Q}{Q} (\wedge_{E_r})$$

$$\frac{P \rightarrow Q \quad P}{Q} (\rightarrow_E)$$

$$\frac{\begin{array}{cc} P & Q \\ \vdots & \vdots \\ R & R \end{array}}{P \vee Q \quad R} (\vee_E)$$

$$\frac{}{\perp} (\perp)$$

$$\frac{\begin{array}{c} \neg P \\ \vdots \\ \perp \end{array}}{P} (\neg\neg E)$$