

CSE 311: Foundations of Computing I

Axioms & Inference Rules

Excluded Middle
$\frac{}{\therefore A \vee \neg A}$

Direct Proof
$\frac{A \Rightarrow B}{\therefore A \rightarrow B}$

Modus Ponens
$\frac{A \quad A \rightarrow B}{\therefore B}$

Intro \wedge
$\frac{A \quad B}{\therefore A \wedge B}$

Elim \wedge
$\frac{A \wedge B}{\therefore A \quad B}$

Intro \vee
$\frac{A}{\therefore A \vee B \quad B \vee A}$

Elim \vee
$\frac{A \vee B \quad \neg A}{\therefore B}$

Intro \forall
$\frac{\text{Let } a \text{ be an arbitrary } \dots}{\therefore \forall x P(x)}$

Elim \forall
$\frac{\forall x P(x)}{\therefore P(a) \text{ for any } a}$

Intro \exists
$\frac{P(c) \text{ for some } c}{\therefore \exists x P(x)}$

Elim \exists
$\frac{\exists x P(x)}{\therefore P(c) \text{ for some special } c}$