

RULES FOR PREDICATE LOGIC

<p>&I</p> $\frac{\begin{array}{c} \mathcal{A} \\ \mathcal{B} \end{array}}{\mathcal{A} \& \mathcal{B}} \quad \frac{\begin{array}{c} \mathcal{A} \\ \mathcal{B} \end{array}}{\mathcal{B} \& \mathcal{A}}$	<p>&O</p> $\frac{\mathcal{A} \& \mathcal{B}}{\mathcal{A}} \quad \frac{\mathcal{A} \& \mathcal{B}}{\mathcal{B}}$	<p>\sim&O</p> $\frac{\sim(\mathcal{A} \& \mathcal{B})}{\mathcal{A} \rightarrow \sim \mathcal{B}}$	<p>&D</p> $\begin{array}{ l} \text{SHOW: } \mathcal{A} \& \mathcal{B} \\ \text{SHOW: } \mathcal{A} \\ \text{SHOW: } \mathcal{B} \end{array}$	<p>DD</p> $\begin{array}{ l} \text{SHOW: } \mathcal{A} \\ \mathcal{A} \end{array}$
<p>\veeI</p> $\frac{\mathcal{A}}{\mathcal{A} \vee \mathcal{B}} \quad \frac{\mathcal{A}}{\mathcal{B} \vee \mathcal{A}}$	<p>\veeO</p> $\frac{\mathcal{A} \vee \mathcal{B} \quad \sim \mathcal{A}}{\mathcal{B}} \quad \frac{\mathcal{A} \vee \mathcal{B} \quad \sim \mathcal{B}}{\mathcal{A}}$	<p>$\sim \vee$O</p> $\frac{\sim(\mathcal{A} \vee \mathcal{B})}{\sim \mathcal{A}} \quad \frac{\sim(\mathcal{A} \vee \mathcal{B})}{\sim \mathcal{B}}$	<p>\veeD (ID)</p> $\begin{array}{ l} \text{SHOW: } \mathcal{A} \vee \mathcal{B} \\ \sim(\mathcal{A} \vee \mathcal{B}) \\ \text{SHOW: } \ast \end{array}$	<p>ID</p> $\begin{array}{ l} \text{SHOW: } \mathcal{A} \\ \sim \mathcal{A} \\ \text{SHOW: } \ast \end{array}$
<p>\rightarrowI</p> <p>no such thing (see CD)</p>	<p>\rightarrowO</p> $\frac{\mathcal{A} \rightarrow \mathcal{C} \quad \mathcal{A}}{\mathcal{C}} \quad \frac{\mathcal{A} \rightarrow \mathcal{C} \quad \sim \mathcal{C}}{\sim \mathcal{A}}$	<p>$\sim \rightarrow$O</p> $\frac{\sim(\mathcal{A} \rightarrow \mathcal{C})}{\mathcal{A} \& \sim \mathcal{C}}$	<p>CD</p> $\begin{array}{ l} \text{SHOW: } \mathcal{A} \rightarrow \mathcal{C} \\ \mathcal{A} \\ \text{SHOW: } \mathcal{C} \end{array}$	
<p>\astI</p> $\frac{\mathcal{A} \quad \sim \mathcal{A}}{\ast}$	<p>DN</p> $\frac{\mathcal{A}}{\sim \sim \mathcal{A}} \quad \frac{\sim \sim \mathcal{A}}{\mathcal{A}}$		<p>\simD</p> $\begin{array}{ l} \text{SHOW: } \sim \mathcal{A} \\ \mathcal{A} \\ \text{SHOW: } \ast \end{array}$	
<p>\forallI</p> <p>no such thing (see UD)</p>	<p>\forallO</p> $\frac{\forall v \mathbb{F}[v]}{\mathbb{F}[\mathbf{o}]}$ <p>old</p>	<p>$\sim \forall$O</p> $\frac{\sim \forall v \Phi}{\exists v \sim \Phi}$	<p>UD</p> $\begin{array}{ l} \text{SHOW: } \forall v \mathbb{F}[v] \\ \text{SHOW: } \mathbb{F}[\mathbf{n}] \end{array}$ <p>new</p>	
<p>\existsI</p> $\frac{\mathbb{F}[\mathbf{o}]}{\exists v \mathbb{F}[v]}$ <p>old</p>	<p>\existsO</p> $\frac{\exists v \mathbb{F}[v]}{\mathbb{F}[\mathbf{n}]}$ <p>new</p>	<p>$\sim \exists$O</p> $\frac{\sim \exists v \Phi}{\forall v \sim \Phi}$	<p>\existsD (ID)</p> $\begin{array}{ l} \text{SHOW: } \exists v \Phi \\ \sim \exists v \Phi \\ \text{SHOW: } \ast \end{array}$	

Φ is any formula. $\mathbb{F}[v]$ is any formula, and v is any variable, and $\mathbb{F}[\alpha]$ results when every free occurrence of v in $\mathbb{F}[v]$ is replaced by α .

Also, **n** is any **NEW NAME**, and **o** is any **OLD NAME**.

A name counts as *old* if it occurs in a line that is neither boxed nor cancelled; otherwise it counts as *new*.