

Applied Formal Methods  
 Homework 1: Propositional Logic  
 Appendix

1. Propositional Inference Rules

Table of Propositional Inference Rules

Abbreviation	Name	If you know all of ...	... then you can infer
$\wedge$ Intro	and-introduction	$\varphi$	$\varphi \wedge \psi$
		$\psi$	
$\wedge$ Elim	and-elimination (left)	$\varphi \wedge \psi$	$\varphi$
	and-elimination (right)	$\varphi \wedge \psi$	$\psi$
$\vee$ Intro	or-introduction (left)	$\varphi$	$\varphi \vee \psi$
	or-introduction (right)	$\psi$	$\varphi \vee \psi$
$\vee$ Elim	or-elimination	$\varphi \vdash \theta$	$\theta$
		$\psi \vdash \theta$	
		$\varphi \vee \psi$	
$\Rightarrow$ Intro	if-introduction	$\varphi, \psi, \dots, \theta \vdash \omega$	$\varphi \wedge \psi \wedge \dots \wedge \theta \Rightarrow \omega$
$\Rightarrow$ Elim	if-elimination (modus ponens)	$\varphi \Rightarrow \psi$	$\psi$
		$\varphi$	
falseIntro	false-introduction	$\varphi$	<b>false</b>
		$\neg\varphi$	
falseElim	false-elimination	<b>false</b>	$\varphi$
RAA	reductio ad absurdum (v. 1)	$\neg\varphi \vdash \mathbf{false}$	$\varphi$
	reductio ad absurdum (v. 2)	$\varphi \vdash \mathbf{false}$	$\neg\varphi$
$\neg$ Intro	negation-introduction	$\varphi$	$\neg\neg\varphi$
$\neg$ Elim	negation-elimination	$\neg\neg\varphi$	$\varphi$
CaseElim	case-elimination(left)	$\varphi \vee \psi$	$\psi$
		$\neg\varphi$	
	case-elimination (right)	$\varphi \vee \psi$	$\varphi$
		$\neg\psi$	