DERIVATION RULES OF SD

Reiteration (R)

	P
▷	**P**

Conjunction Introduction (&I)

	P
	Q
▷	**P & Q**

Conjunction Elimination (&E)

	P & Q		**P & Q**
		or	
▷	**P**	▷	**Q**

Conditional Elimination (⊃E)

	P ⊃ Q
	P
▷	**Q**

Conditional Introduction (⊃I)

		P
		Q
▷	**P ⊃ Q**	

Negation Introduction (~I)

		P
		Q
		~Q
▷	**~P**	

Negation Elimination (~E)

		~P
		Q
		~Q
▷	**P**	

Disjunction Introduction (∨I)

	P		**P**
		or	
▷	**P ∨ Q**	▷	**Q ∨ P**

Disjunction Elimination (∨E)

	P ∨ Q	
		P
		R
		Q
		R
▷	**R**	

Biconditional Introduction (≡I)

		P
		Q
		Q
		P
▷	**P ≡ Q**	

Biconditional Elimination (≡E)

	P ≡ Q		**P ≡ Q**
	P	or	**Q**
▷	**Q**	▷	**P**

DERIVATION RULES OF SD+

Modus Tollens (MT)

	P ⊃ **Q**
	~**Q**
▷	~**P**

Hypothetical Syllogism (HS)

	P ⊃ **Q**
	Q ⊃ **R**
▷	**P** ⊃ **R**

Disjunctive Syllogism (DS)

			or		
	P ∨ **Q**			**P** ∨ **Q**	
	~**P**			~**Q**	
▷	**Q**		▷	**P**	

Commutation (Com)
P & **Q** ◁▷ **Q** & **P**
P ∨ **Q** ◁▷ **Q** ∨ **P**

Association (Assoc)
P & (**Q** & **R**) ◁▷ (**P** & **Q**) & **R**
P ∨ (**Q** ∨ **R**) ◁▷ (**P** ∨ **Q**) ∨ **R**

Implication (Impl)
P ⊃ **Q** ◁▷ ~**P** ∨ **Q**

Double Negation (DN)
P ◁▷ ~~**P**

De Morgan (DeM)
~(**P** & **Q**) ◁▷ ~**P** ∨ ~**Q**
~(**P** ∨ **Q**) ◁▷ ~**P** & ~**Q**

Idemptotence (Idem)
P ◁▷ **P** & **P**
P ◁▷ **P** ∨ **P**

Transposition (Trans)
P ⊃ **Q** ◁▷ ~**Q** ⊃ ~**P**

Exportation (Exp)
P ⊃ (**Q** ⊃ **R**) ◁▷ (**P** & **Q**) ⊃ **R**

Distribution (Dist)
P & (**Q** ∨ **R**) ◁▷ (**P** & **Q**) ∨ (**P** & **R**)
P ∨ (**Q** & **R**) ◁▷ (**P** ∨ **Q**) & (**P** ∨ **R**)

Equivalence (Equiv)
P ≡ **Q** ◁▷ (**P** ⊃ **Q**) & (**Q** ⊃ **P**)
P ≡ **Q** ◁▷ (**P** & **Q**) ∨ (~**P** & ~**Q**)

Primary Proof Strategies

Clue	Strategy
main connective of sentence to be proved is a ⊃	use ⊃I
main connective of sentence to be proved is a ≡	use ≡I
main connective of sentence to be proved is a ~	use ~I
main connective of one of the premises is a ∨	use ∨E
main connective of one of the premises is a ~	use ~E or ~I and try to construct an un-negated version of the negated premise

Fallback Strategies

Use ~E or ~I. (~E and ~I will always work but sometimes takes longer.)

In SD, try to spot applications of SD+ rules and use workarounds for the SD+ rule (See reverse. This usually takes longer.).

WORKAROUND FOR MODUS TOLLENS

1	A ⊃ B			Assumption
2	~B			Assumption
3		A		A/~I
4		B		1,3 ⊃E
5		~B		2 R
6	~A			3–5 ~I

WORKAROUND FOR HYPOTHETICAL SYLLOGISM

1	A ⊃ B			Assumption
2	B ⊃ C			Assumption
3		A		A/⊃I
4		B		1,3 ⊃E
5		C		2,4 ⊃E
6	A ⊃ C			3–5 ⊃I

WORKAROUND FOR DISJUNCTIVE SYLLOGISM

1	A v B				Assumption
2	~A				Assumption
3		A			A/vE
4			~B		A/~E
5			~A		2 R
6			A		3 R
7		B			4–6 ~E
8		B			A/vE
9		B			8 R
10	B				1, 3–7, 8–9 vE