

B1: Premises: $(P \rightarrow Q)$, P . Conclusion: Q

1		$(P \rightarrow Q)$	Premise
2		P	Premise
3		<hr/> Q	,

B2: Premises: $(P \rightarrow Q)$, $\sim Q$. Conclusion: $\sim P$

1		$(P \rightarrow Q)$	Premise
2		$\sim Q$	Premise
3		<hr/> $\sim P$,

B3: Premises: $\sim\sim Q$. Conclusion: Q

1		$\sim\sim Q$	Premise
2		Q	,

B4: Premises: $\sim Q$, $(\sim Q \rightarrow S)$. Show: S .

1		$\sim Q$	Premise
2		$(\sim Q \rightarrow S)$	Premise
3		S	,

B5: Premises: $(S \rightarrow \sim Q)$, $(P \rightarrow S)$, $\sim\sim P$. Show: $\sim Q$.

1	$(S \rightarrow \sim Q)$	Premise
2	$(P \rightarrow S)$	Premise
3	$\sim\sim P$	Premise
4	P	,
5	S	,
6	$\sim Q$,

B6: Premises: $(T \rightarrow P)$, $(Q \rightarrow S)$, $(S \rightarrow T)$, $\sim P$. Show: $\sim Q$.

1	$(T \rightarrow P)$	Premise
2	$(Q \rightarrow S)$	Premise
3	$(S \rightarrow T)$	Premise
4	$\sim P$	Premise
5	$\sim T$,
6	$\sim S$,
7	$\sim Q$,

B7: Premises: $R, P, (P \rightarrow (R \rightarrow Q))$. Show: Q .

1	R	Premise
2	P	Premise
3	$(P \rightarrow (R \rightarrow Q))$	Premise
4	$(R \rightarrow Q)$,
5	Q	,

B8: Premises: $((R \rightarrow S) \rightarrow Q), \sim Q, (\sim(R \rightarrow S) \rightarrow V)$. Show: V .

1	$((R \rightarrow S) \rightarrow Q)$	Premise
2	$\sim Q$	Premise
3	$((\sim(R \rightarrow S) \rightarrow V)$	Premise
4	$\sim(R \rightarrow Q)$,
5	V	,

B9: Premises: $(P \rightarrow (Q \rightarrow R))$, $\sim(Q \rightarrow R)$. Show: $\sim P$.

1	$(P \rightarrow (Q \rightarrow R))$	Premise
2	$\sim(Q \rightarrow R)$	Premise
3	$\sim P$,

B10: Premises: $(\sim(Q \rightarrow R) \rightarrow P)$, $\sim P$, Q . Show: R .

1	$(\sim(Q \rightarrow R) \rightarrow P)$	Premise
2	$\sim P$	Premise
3	Q	Premise
4	$\sim\sim(Q \rightarrow R)$,
5	$(Q \rightarrow R)$,
6	R	,

B11: Premises: $P, (P \rightarrow R), (P \rightarrow (R \rightarrow Q))$. Show: Q .

1		P	Premise
2		$(P \rightarrow R)$	Premise
3		$(P \rightarrow (R \rightarrow Q))$	Premise
<hr/>			
4		R	,
5		$(R \rightarrow Q)$,
6		Q	,

C1: Premises: $P, (P \rightarrow R), (P \rightarrow (R \rightarrow Q))$. Show: Q .

1	$\sim Q$	Premise
2	$(\sim Q \rightarrow S)$	Premise
3		1, 2 modus ponens

C2: Premises: $(S \rightarrow \sim Q), (P \rightarrow S), \sim\sim P$. Show: $\sim Q$.

1	$(S \rightarrow \sim Q)$	Premise
2	$(P \rightarrow S)$	Premise
3	Q	Premise
4		3, double negation
5		2, 4 modus ponens
6		1, 5 modus ponens

C3: Premises: $(T \rightarrow P)$, $(Q \rightarrow S)$, $(S \rightarrow T)$, $\sim P$. Show: $\sim Q$.

1	$(T \rightarrow P)$	Premise
2	$(Q \rightarrow S)$	Premise
3	$(S \rightarrow T)$	Premise
4	$\sim P$	Premise
<hr/>		
5		1, 4 modus tollens
6		3, 5 modus tollens
7		2, 6 modus tollens

C4: Premises: R , P , $(P \rightarrow (R \rightarrow Q))$. Show: Q .

1	R	Premise
2	P	Premise
3	$(P \rightarrow (R \rightarrow Q))$	Premise
<hr/>		
4		2, 5 modus ponens
5		1, 4 modus tollens

C5: Premises: $((R \rightarrow S) \rightarrow Q)$, $\sim Q$, $(\sim(R \rightarrow S) \rightarrow V)$. Show: V .

1	$((R \rightarrow S) \rightarrow Q)$	Premise
2	$\sim Q$	Premise
3	$(\sim(R \rightarrow S) \rightarrow V)$	Premise
4		1, 2 modus tollens
5		1, 4 modus ponens

C6: Premises: $(P \rightarrow (Q \rightarrow R))$, $\sim(Q \rightarrow R)$. Show: $\sim P$.

1	$(P \rightarrow (R \rightarrow Q))$	Premise
2	$\sim(Q \rightarrow R)$	Premise
3		1, 2 modus tollens

C7: Premises: $(\sim(Q \rightarrow R) \rightarrow P)$, $\sim P$, Q . Show: R .

1	$(\sim(Q \rightarrow R) \rightarrow P)$	Premise
2	$\sim P$	Premise
3	Q	Premise
4		
5		
6		

C8: Premises: P , $(P \rightarrow R)$, $(P \rightarrow (R \rightarrow Q))$. Show: Q .

1	P	Premise
2	$(P \rightarrow R)$	Premise
3	$(P \rightarrow (R \rightarrow Q))$	Premise
4		
5		
6		