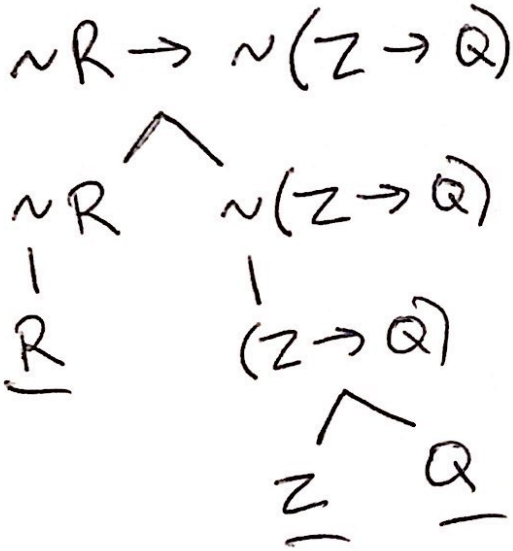
Practice Midterm 1 Answers

1) c (a "necessarily false premise" is a premise that is false in every possible situation)

2) d

3)a) unofficial symbolic sentence



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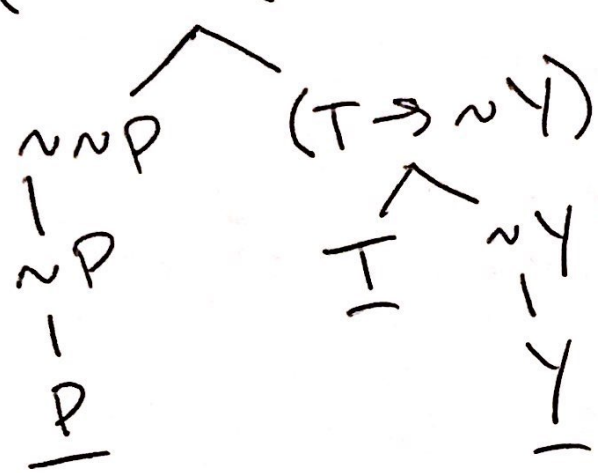
3) b) official symbolic sentence

$\sim(\sim\sim P \rightarrow (T \rightarrow \sim Y))$

|

$(\sim\sim P \rightarrow (T \rightarrow \sim Y))$



4) a) T = there is lightning

Y = they call off the game

P = Jack is here

$\boxed{\sim P \rightarrow (Y \rightarrow T)}$

4) b) U = I am hungry

R = it rains

W = I go for a walk

$\boxed{\sim U \rightarrow (R \rightarrow \sim W)}$

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4) c) S = Jill did not go to the party because she was tired.

S

(It's important to remember that "because" is not truth-functional, & therefore cannot be represented by the conditional connective. In this case, we can't even represent the negation (Jill did not go) because it's embedded in the "antecedent" clause of the "because" connective. If we tried to represent this with a negation, e.g. as ~S, that would be saying something like this:

"It's not the case that (Jill went to the party because she was tired.)"

which is not an accurate symbolization. So here we're confined to just using a single sentence letter.)

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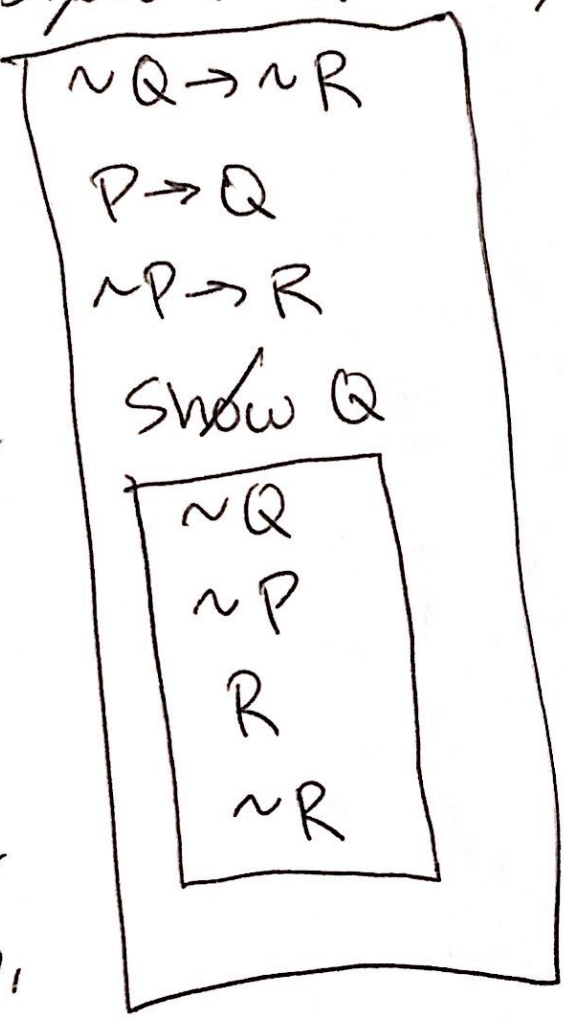
5) 1. Show $(\sim Q \rightarrow \sim R) \rightarrow Q$



2.	$\sim Q \rightarrow \sim R$	ASS CD
3.	$P \rightarrow Q$	Pr
4.	$\sim P \rightarrow R$	Pr
5.	Show Q	
6.	$\sim Q$	ASS ID
7.	$\sim P$	3, 6 MT
8.	R	4, 7 MP
9.	$\sim R$	2, 6 MP
10.		8, 9 ID
11.		5, CD

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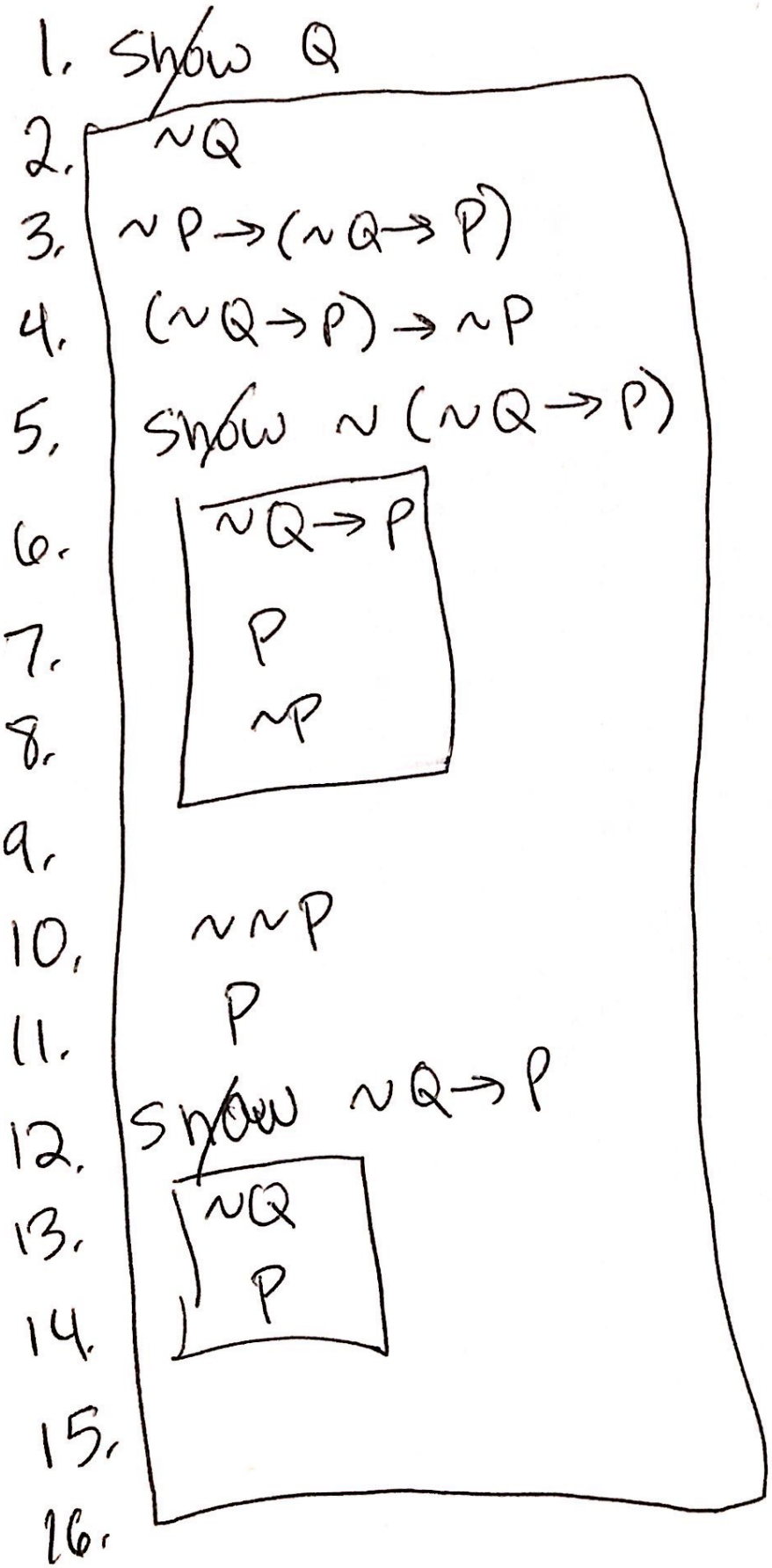
6)



ASS ID
Pr
Pr

ASS ID
2,6 MP
4,6 MP
7,8 ID
3,5 MT
10, DN

ASS CD
11, R
14, CD
12,5 ID

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7)

1.	Show U	
2.	~U	Ass ID
3.	(P→~Q) → ~(R→S)	Pr
4.	Q→~P	Pr
5.	~(R→U)→S	Pr
6.	Show (P→~Q)	
7.	P	Ass CD
8.	~~P	7 DN
9.	~Q	4,8 MT
10.		9, CD
11.	~(R→S)	3,6 MP
12.	Show (R→S)	
13.	R	Ass CD
14.	Show S	
15.	~S	Ass ID
16.	~~(R→U)	5,15 MT
17.	R→U	16, DN
18.	U	13,17 MP
19.	~U	2, R
20.		18,19 ID
21.		14. CD
22.		11,12 ID

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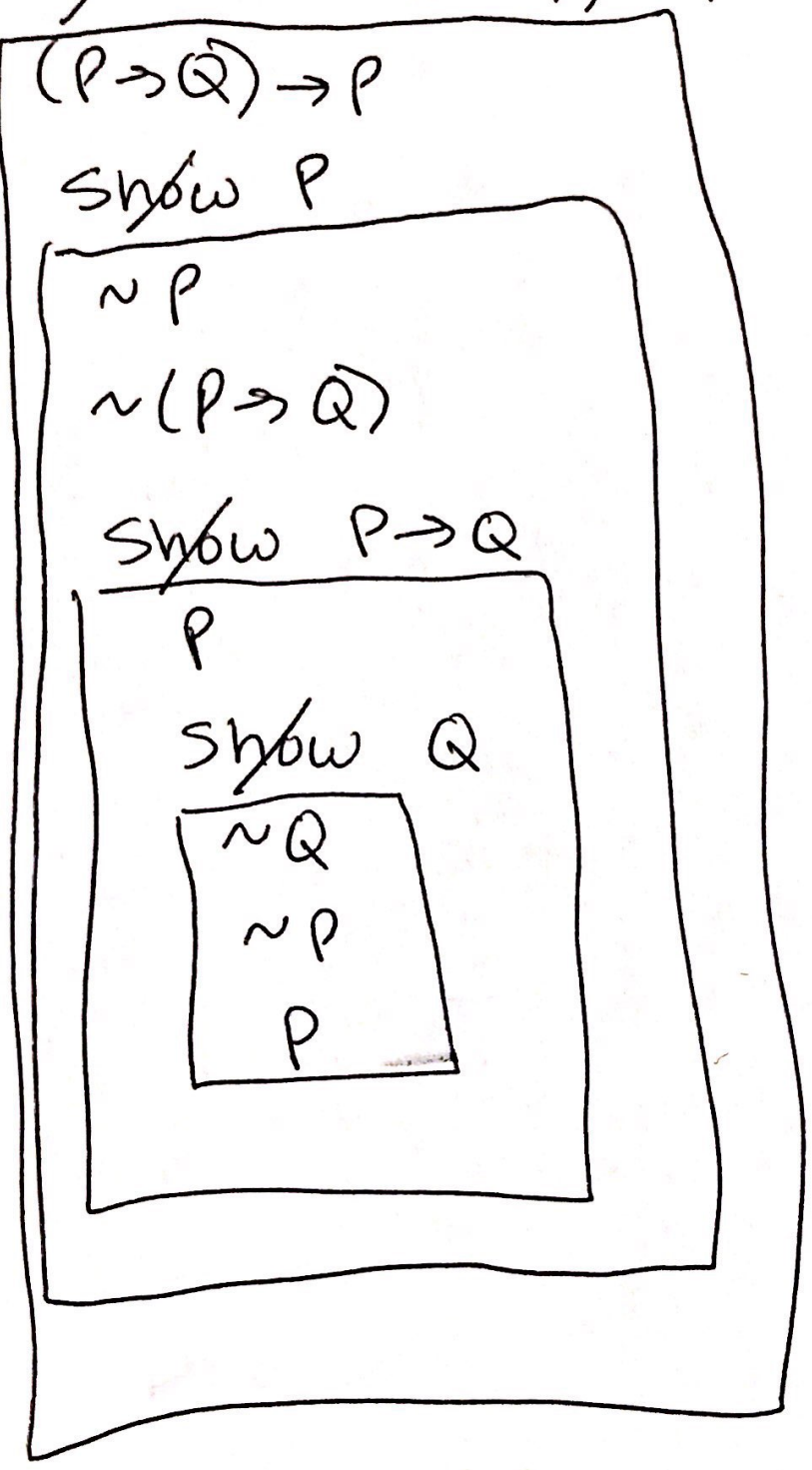
8) 1. Show $((P \to Q) \to P) \to P$



Ass CD

Ass ID

2,4 MT

Ass CD

Ass ID

4, R

7, R

10, 11 ID

8, CD

5,6 ID

3, CD

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9)

	P	Q	R	S	P → ~(Q → S)	Q → (~P → R)	S → P
	T	T	T	T			T
	T	T	T	F			T
	T	T	F	T			T
	T	T	F	F			T
	T	F	T	T			T
	T	F	T	F			T
	T	F	F	T			T
	T	F	F	F			T
9	F	T	T	T	I	T I T T T	9 F
	F	T	T	F			T
11	F	T	F	T			11 F
	F	T	F	F			T
13	F	F	T	T			13 F
	F	F	T	F			T
15	F	F	F	T			15 F
	F	F	F	F			T

counter-example, line 9.

Invalid

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