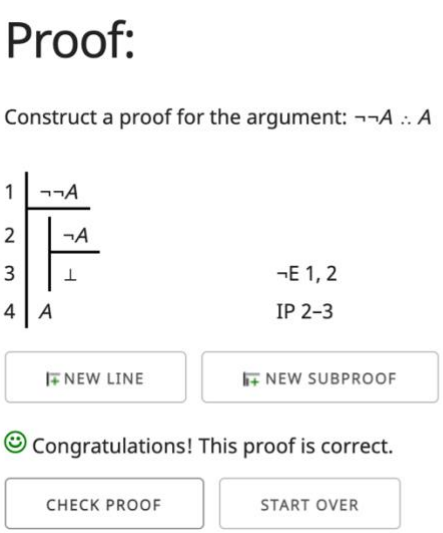
Henry Jacobs

October 3, 2021

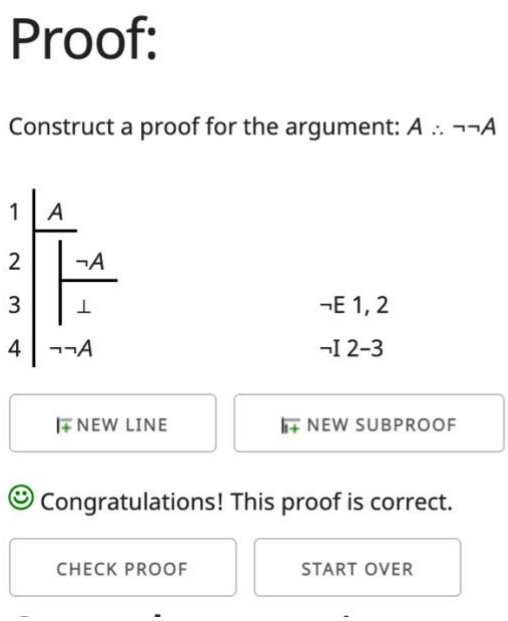
Professor Boady

Homework 2

1.



2.



3.

Proof:

Construct a proof for the argument: $A \wedge B \therefore B \wedge A$

1	$A \wedge B$	
2	A	$\wedge$E 1
3	B	$\wedge$E 1
4	$(B \wedge A)$	$\wedge$I 2, 3

NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

CHECK PROOF START OVER

4.

Construct a proof for the argument: $A \vee B \therefore B \vee A$

1	$A \vee B$	
2	A	
3	$B \vee A$	$\vee$I 2
4	B	
5	$B \vee A$	$\vee$I 4
6	$B \vee A$	$\vee$E 1, 2–3, 4–5

NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

CHECK PROOF START OVER

5.

Proof:

Construct a proof for the argument: $A \vee (B \wedge C) \therefore (A \vee B) \wedge (A \vee C)$

1	$A \vee (B \wedge C)$	
2	$\quad A$	
3	$\quad (A \vee B)$	$\vee$I 2
4	$\quad (B \wedge C)$	
5	$\quad B$	$\wedge$E 4
6	$\quad (A \vee B)$	$\vee$I 5
7	$(A \vee B)$	$\vee$E 1, 2–3, 4–6
8	$\quad A$	
9	$\quad (A \vee C)$	$\vee$I 8
10	$\quad (B \wedge C)$	
11	$\quad C$	$\wedge$E 10
12	$\quad (A \vee C)$	$\vee$I 11
13	$(A \vee C)$	$\vee$E 1, 8–9, 10–12
14	$(A \vee B) \wedge (A \vee C)$	$\wedge$I 7, 13

NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

6.

Proof:

Construct a proof for the argument: $(A \vee B) \wedge (A \vee C) \therefore A \vee (B \wedge C)$

1	$(A \vee B) \wedge (A \vee C)$		
2	$A \vee B$	$\wedge$E 1	
3	$A \vee C$	$\wedge$E 1	
4	$\quad A$		
5	$\quad A \vee (B \wedge C)$	$\vee$I 4	
6	$\quad B$		
7	$\quad\quad C$		
8	$\quad\quad B \wedge C$	$\wedge$I 6, 7	
9	$\quad\quad A \vee (B \wedge C)$	$\vee$I 8	
10	$\quad\quad A$		
11	$\quad\quad A \vee (B \wedge C)$	$\vee$I 10	
12	$\quad A \vee (B \wedge C)$	$\vee$E 3, 7–9, 10–11	
13	$A \vee (B \wedge C)$	$\vee$E 2, 4–5, 6–12	

NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

CHECK PROOF START OVER

7.

Construct a proof for the argument: $A \rightarrow B \therefore \neg A \vee B$

1	$A \rightarrow B$	
2	$\quad \neg(\neg A \vee B)$	
3	$\quad\quad A$	
4	$\quad\quad B$	$\rightarrow$E 1, 3
5	$\quad\quad \neg A \vee B$	$\vee$I 4
6	$\quad\quad \bot$	$\neg$E 2, 5
7	$\quad \neg A$	$\neg$I 3–6
8	$\quad \neg A \vee B$	$\vee$I 7
9	$\quad \bot$	$\neg$E 2, 8
10	$\neg A \vee B$	IP 2–9

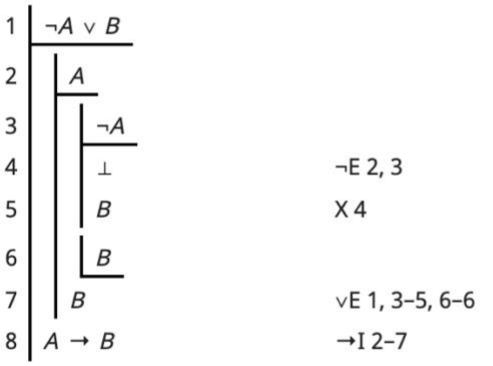
NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

8.

Proof:

Construct a proof for the argument: $\neg A \vee B \therefore A \rightarrow B$



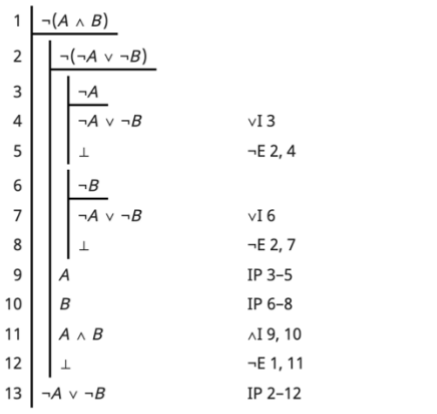
NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

9.

Proof:

Construct a proof for the argument: $\neg(A \wedge B) \therefore \neg A \vee \neg B$



NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

10.

Construct a proof for the argument: $\neg A \vee \neg B \therefore \neg(A \wedge B)$

1	$\neg A \vee \neg B$	
2	$A \wedge B$	
3	A	$\wedge$E 2
4	B	$\wedge$E 2
5	$\neg A$	
6	$\bot$	$\neg$E 3, 5
7	$\neg(A \wedge B)$	X 6
8	$\neg B$	
9	$\bot$	$\neg$E 4, 8
10	$\neg(A \wedge B)$	X 9
11	$\neg(A \wedge B)$	$\vee$E 1, 5–7, 8–10
12	$\bot$	$\neg$E 2, 11
13	$\neg(A \wedge B)$	$\neg$I 2–12

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.