Question 1: ¬¬A ∴ A

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

1	$\neg\neg A$		
2	| $\neg A$		
3	| $\bot$	¬E 1, 2	
4	A	IP 2–3	

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF START OVER

Sample exercise sets

Question 2: A ∴ ¬¬A

Proof:

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

1	A		
2	| $\neg A$		
3	| $\bot$	⊥I 1, 2	
4	$\neg\neg A$	¬I 2–3	

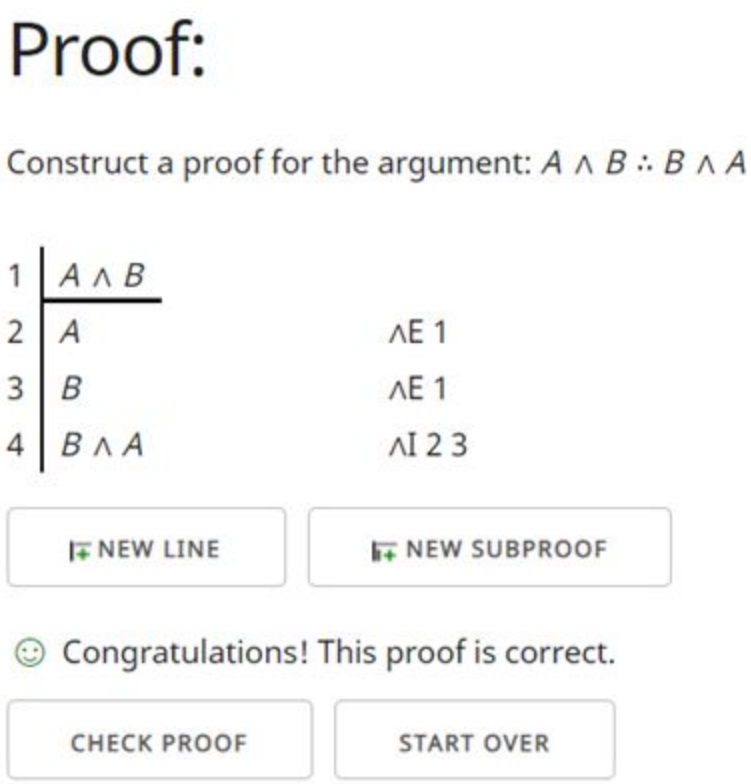
NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

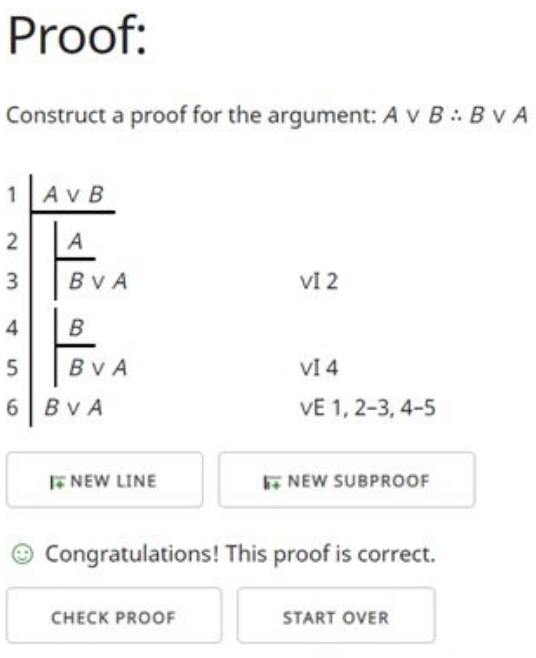
CHECK PROOF START OVER

Sample exercise sets

Question 3: A ∧ B ∴ B ∧ A



Question 4 : A ∨ B ∴ B ∨ A



Question 5 : A ∨ (B ∧ C) ∴ (A ∨ B) ∧ (A ∨ C)

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

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF START OVER

Question 6: (A ∨ B) ∧ (A ∨ C) ∴ A ∨ (B ∧ C)

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

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF START OVER

Sample exercise sets

Question 7 : A ∨ ¬A, A ==⇒ B, B ==⇒ X, ¬X ==⇒ A ∴ X

Proof:

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

1	$A \vee \neg A$	
2	$A \rightarrow B$	
3	$B \rightarrow X$	
4	$\neg X \rightarrow A$	
5	$\quad A$	
6	$\quad B$	→E 2 5
7	$\quad X$	→E 3 6
8	$\quad \neg A$	
9	$\quad\quad \neg X$	
10	$\quad\quad A$	→E 4 9
11	$\quad\quad B$	→E 2 10
12	$\quad\quad X$	→E 3 11
13	$\quad\quad \bot$	¬E 9 12
14	$\quad X$	IP 9–13
15	X	∨E 1, 5–7, 8–14

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF START OVER

Sample exercise sets

Question 8: A ==⇒ B ∴ ¬A ∨ B

Proof:

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

1	$A \rightarrow B$	
2	$\neg(\neg A \vee B)$	
3	A	
4	B	→E 1 3
5	$\neg A \vee B$	∨I 4
6	$\perp$	⊥I 2 5
7	$\neg A$	¬I 3-6
8	$\neg A \vee B$	∨I 7
9	$\perp$	⊥I 2 8
10	$\neg A \vee B$	IP 2-9

NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

CHECK PROOF START OVER

Sample exercise sets

- Sample Truth-Functional Logic exercises (Chap. 15, ex. C; Chap. 17, ex. B)
- Sample First-Order Logic exercises (Chap. 32, ex. E; Chap. 34, ex. A)

Question 9 : ¬A ∨ B ∴ A ⟹ B

Select if TFL or FOL syntax:

◉ TFL ○ FOL

Premises (separate with "," or ";"):

¬A ∨ B

Conclusion:

A ⇒ B

CREATE PROBLEM

Proof:

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

1	$\neg A \vee B$	
2	A	
3	$\neg A$	
4	$\bot$	$\bot$I 2 3
5	B	X 4
6	B	
7	B	∨E 1, 3–5, 6–6
8	$A \rightarrow B$	→I 2–7

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

Basic rules

m	$\mathcal{A}$	
n	$\mathcal{B}$	
	$\mathcal{A} \wedge \mathcal{B}$	∧I m, n
m	$\mathcal{A} \wedge \mathcal{B}$	
	$\mathcal{A}$	∧E m
m	$\mathcal{A} \wedge \mathcal{B}$	
	$\mathcal{B}$	∧E m
m	$\mathcal{A}$	
	$\mathcal{A} \vee \mathcal{B}$	∨I m
m	$\mathcal{A}$	
	$\mathcal{B} \vee \mathcal{A}$	∨I m
m	$\mathcal{A} \vee \mathcal{B}$	
i	$\mathcal{A}$	
j	$\mathcal{C}$	
k	$\mathcal{B}$	
l	$\mathcal{C}$	
	$\mathcal{C}$	∨E m, i–j,

Question 10: ¬(A ∧ B) ∴ ¬A ∨ ¬B

Premises (separate with "," or ";"):

¬(A ∧ B)

Conclusion:

¬A ∨ ¬B

CREATE PROBLEM

Proof:

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

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

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF START OVER

Question 11: (¬A ∨ ¬B) ∴ ¬(A ∧ B)