

Exercícios

Prove que as seguintes conclusões são válidas:

1. $(A \rightarrow B) \wedge [B \rightarrow (C \rightarrow D)] \wedge [A \rightarrow (B \rightarrow C)] \wedge A \rightarrow D$
2. $[A \rightarrow (B \rightarrow C)] \wedge B \wedge A \rightarrow C$
3. $(A \wedge B) \rightarrow \sim(A \rightarrow \sim B)$
4. $(P \vee Q) \wedge \sim P \rightarrow Q$
5. $(P \rightarrow Q) \wedge \sim Q \rightarrow \sim P$
6. $(\sim Q \rightarrow \sim P) \wedge P \rightarrow Q$
7. $(P \rightarrow Q) \wedge (\sim P \rightarrow Q) \rightarrow Q$
8. $(A \vee B) \wedge (A \rightarrow C) \wedge (B \rightarrow C) \rightarrow C$
9. $(P \vee (Q \wedge R)) \wedge (\sim R \vee S) \wedge (S \rightarrow \sim T) \wedge T \rightarrow P$

Respostas

- 1.**
1. $A \rightarrow B$ hip
 2. $B \rightarrow (C \rightarrow D)$ hip
 3. $A \rightarrow (B \rightarrow C)$ hip
 4. A hip
 5. B mp 1, 4
 6. $B \rightarrow C$ mp 3, 4
 7. C mp 5, 6
 8. $C \rightarrow D$ mp 2, 5
 9. D mp 8, 9
- 2.**
1. $A \rightarrow (B \rightarrow C)$ hip
 2. B hip
 3. A hip
 4. $B \rightarrow C$ mp 1, 3
 5. C mp 2, 4
- 3.**
1. $A \wedge B$ hip
 2. $\sim\sim(A \wedge B)$ dn 1
 3. $\sim(\sim A \vee \sim B)$ de morgan 2
 4. $\sim(A \rightarrow \sim B)$ cond 3
- 4.**
1. $P \vee Q$ hip
 2. $\sim P$ hip
 3. $\sim\sim(P \vee Q)$ dn 1
 4. $\sim\sim P \vee Q$ de morgan 3
 5. $\sim P \rightarrow Q$ cond 4
 6. Q mp 2, 6
- 5.**
1. $P \rightarrow Q$ hip
 2. $\sim Q$ hip
 3. $\sim P$ mt 1, 2
- 6.**
1. $\sim Q \rightarrow \sim P$ hip
 2. P hip
 3. $\sim(\sim Q)$ mt 1, 2
 4. Q dn 3
- 7.**
1. $P \rightarrow Q$ hip
 2. $\sim P \rightarrow Q$ hip
 3. $\sim Q \rightarrow \sim\sim P$ cont 2
 4. $\sim Q \rightarrow P$ dn 3
 5. $\sim Q \rightarrow Q$ sh 4, 1
 6. $\sim\sim Q \vee Q$ cond 5
 7. $Q \vee Q$ dn 6
 8. Q idem 7
- 8.**
1. $A \vee B$ hip
 2. $A \rightarrow C$ hip
 3. $B \rightarrow C$ hip
 4. $\sim\sim A \vee B$ dn 1
 5. $\sim A \rightarrow B$ cond 4
 6. $\sim A \rightarrow C$ sh 5, 3
 7. $(A \rightarrow C) \wedge (\sim A \rightarrow C)$ cond 2, 6
 8. C Passos do exercício 7
- 9.**
1. $P \vee (Q \wedge R)$ hip
 2. $\sim R \vee S$ hip
 3. $S \rightarrow \sim T$ hip
 4. T hip
 5. $\sim\sim T$ dn 4
 6. $\sim S$ mt 5, 3
 7. $S \vee \sim R$ com 2
 8. $\sim\sim S \vee \sim R$ dn 7
 9. $\sim S \rightarrow \sim R$ cond 8
 10. $\sim R$ mp 6, 9
 11. $\sim R \vee \sim Q$ adição 10
 12. $\sim Q \vee \sim R$ com 11
 13. $\sim(Q \wedge R)$ de morgan 12
 14. $(Q \wedge R) \vee P$ com 1
 15. P sd 13, 14