SAT3Q

Started on	Monday, 30 October 2023, 7:16 PM
State	Finished
Completed on	Monday, 30 October 2023, 7:31 PM
Time taken	15 mins 1 sec
Grade	**3.00** out of 5.00 (**60**%)

Question 1

Correct

Mark 2.00 out of 2.00

Flag question

Given propositional formula

(d ∨ ¬a) ∧ (¬f ∨ ¬c) ∧ (¬b ∨ ¬a) ∧ (e ∨ ¬b) ∧ (¬c) ∧ (a ∨ b ∨ c) ∧ (¬d ∨ e) ∧ (¬e ∨ ¬c)

hich two clauses given in the list below can be rived with one or more applications of the solution rule?

(Keep in mind that disjunction is commutative, i.e., the order of literals in a clause is irrelevant).

Select one or more:

- [ ] 1. empty clause
- [x] 2. (¬a ∨ ¬c) ✔
- [ ] 3. ¬a
- [x] 4. (d ∨ e ∨ ¬f) ✔
- [ ] 5. (d ∨ e ∨ f)

Die Antwort ist richtig.

The correct answers are: (d ∨ e ∨ ¬f), (¬a ∨ ¬c)

Question 2

Partially correct

Mark 1.00 out of 2.00

Flag question

Which of the following rules are applicable on sequent ¬a ∧ b, ¬(a ∧ (¬c ∨ d)), ¬e ⊢ a in the next step?

Select one or more:

- [x] 1. A-¬ ✔
- [ ] 2. This is an axiom.
- [ ] 3. P-∨
- [ ] 4. A-∧
- [ ] 5. P-∧
- [ ] 6. A-∨
- [ ] 7. P-¬

Die Antwort ist teilweise richtig.

You have correctly selected 1.

The correct answers are: A-∧, A-¬

Question 3

Incorrect

Mark 0.00 out of 1.00

Flag question

Which of the following proofs are correct derivations in the sequent calculus (note that labels of the rules have been omitted).

Select one or more:

- [ ] a.

$$\dfrac{\dfrac{\dfrac{a, \neg a \vdash b}{a \vdash (a \vee b)}}{\dfrac{\neg\neg a \vdash (a \vee b)}{\neg(a \vee b) \vdash \neg a}} \quad \dfrac{\vdots}{\neg(a \vee b) \vdash \neg b}}{\dfrac{\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\dfrac{\vdash ((a \vee b) \vee (\neg a \wedge \neg b))}{\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b))}}} \quad \vdots$$
$$\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b)) \wedge (\neg(\neg a \wedge \neg b) \vee \neg(a \vee b))$$

- [ ] b.

$$\dfrac{\dfrac{\dfrac{a, \neg a \vdash b}{a \vdash (a \vee b)}}{\dfrac{\neg\neg a \vdash (a \vee b)}{\neg(a \vee b) \vdash \neg a}} \quad \dfrac{\vdots}{\neg(a \vee b) \vdash \neg b}}{\dfrac{\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\dfrac{\neg\neg\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b))}}} \quad \vdots$$
$$\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b)) \wedge (\neg(\neg a \wedge \neg b) \vee \neg(a \vee b))$$

- [x] c. ✘

$$\dfrac{\dfrac{\dfrac{a, a \vdash b}{a \vdash (a \vee b)}}{\dfrac{\neg\neg a \vdash (a \vee b)}{\neg(a \vee b) \vdash \neg a}} \quad \dfrac{\vdots}{\neg(a \vee b) \vdash \neg b}}{\dfrac{\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\dfrac{\neg\neg\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b))}}} \quad \vdots$$
$$\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b)) \wedge (\neg(\neg a \wedge \neg b) \vee \neg(a \vee b))$$

- [ ] d.

$$\dfrac{\dfrac{\dfrac{a, a \vdash b}{a \vdash (a \vee b)}}{\dfrac{\neg\neg a \vdash (a \vee b)}{\neg(a \vee b) \vdash \neg a}} \quad \dfrac{\vdots}{\neg(a \vee b) \vdash \neg b}}{\dfrac{\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\dfrac{\neg\neg\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b))}}} \quad \vdots$$
$$\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b)) \wedge (\neg(\neg a \wedge \neg b) \vee \neg(a \vee b))$$

e Antwort ist falsch.

The correct answer is:

$$\dfrac{\dfrac{\dfrac{a, \neg a \vdash b}{a \vdash (a \vee b)}}{\dfrac{\neg\neg a \vdash (a \vee b)}{\neg(a \vee b) \vdash \neg a}} \quad \dfrac{\vdots}{\neg(a \vee b) \vdash \neg b}}{\dfrac{\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\dfrac{\neg\neg\neg(a \vee b) \vdash (\neg a \wedge \neg b)}{\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b))}}} \quad \vdots$$
$$\vdash (\neg\neg(a \vee b) \vee (\neg a \wedge \neg b)) \wedge (\neg(\neg a \wedge \neg b) \vee \neg(a \vee b))$$