

Question 1:

S1: $P \rightarrow Q$

S2: $R \rightarrow \neg Q$

S3: $P \rightarrow \neg R$

S4: $S2 \rightarrow S3$

[6 points] Prove using inference rules, $S1 \rightarrow S4$.

Question 2:

[6 points] Convert the following into a CNF $\neg(P \rightarrow (Q \wedge R))$

Question 3:

- a. [2 points] When do we call a logic decidable?
- b. [6 points] Argue whether the zeroth-order logic is decidable or not.

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Question 4: [1+2 points] What is the name of the search algorithm used in the AlphaGo system ? What are 2 key differences from basic search algorithms like Depth First Search and Breadth First Search ?



Question 5: [1+2+3 points] What does the term Underfitting mean in ML ? Please share example Train and Test data [containing 10 and 7 numbers in the respective sets] and present a function which can be considered Underfit. Please explain mathematically why the solution presented should be considered Underfit.

