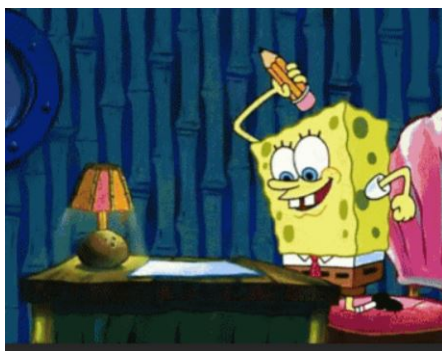


Homework 1

September 16, 2019



Deadline

Due: September 23, 2019, 23:59. Good luck!

Problem 1

Determine whether the following sentences are propositions. Try to determine the truth value if they are propositions. Otherwise, clarify the reason why they are not propositions.

- The Riemann Hypothesis is right.
- 12 is a prime number.
- $x + y = 6$
- What a beautiful flower!
- $3 - 1$
- Tom stays at home on weekends.
- This sentence is wrong.

Problem 2

Use variables and connectives in propositional logic to formally represent the following statement.

- If the cheese is gone, either Tom eats it or Jerry eats it.
- Tom won't go home unless it rains.

Problem 3

P signifies "Tom is a cat" and Q signifies "Tom likes eating fish". Interpret the following proposition in natural language.

- $(\neg P) \wedge (\neg Q)$
- $P \rightarrow Q$
- $\neg(P \vee Q)$

Problem 4

Build the truth table of following propositions. You can merge some truth tables into one truth tables like p22 of slides. You will find some interesting things.

- $P \rightarrow Q, (\neg Q) \rightarrow (\neg P), (\neg P) \vee Q, (\neg P) \rightarrow (\neg Q)$
- $(P \rightarrow Q) \rightarrow ((Q \rightarrow R) \rightarrow (P \rightarrow R))$

Submission

Electronically submit your homework by sending the file to piazza. The detailed operation process will be introduced later. The requirement includes:

1. Please submit a single pdf file containing the homework 1. Its name is "id+name.pdf" like "111111111111张三.pdf".
2. You can write in Microsoft Word and convert the file into pdf. You can also use latex or markdown to generate a pdf. If you use latex or markdown, <https://www.tablesgenerator.com/> can help you generate truth tables.
3. You can write the homework in Chinese.
4. If you violate the requirement, we will deduct your points.

Hint

Paradox is not proposition.