Homework #4

Due May 31 by 11:59pm **Points** 20 **Submitting** a file upload
Available May 17 at 12am - Jun 2 at 11:59pm

This assignment was locked Jun 2 at 11:59pm.

1. (7 points) Decide if each of the following sentences is valid, unsatisfiable, or neither. Verify your decision using truth tables or the equivalence rules.(I used - for negation, V for or, and ^ for and).

a. Smoke => Smoke
b. Smoke => Fire
c. (Smoke => Fire) => (- Smoke => - Fire)
d. Smoke V Fire V - Fire
e. ((Smoke ^ Heat) => Fire) <=> ((Smoke => Fire) V (Heat => Fire))
f. (Smoke => Fire) => ((Smoke ^ Heat) => Fire)
g. Big V Dumb V (Big => Dumb)

2. (7 points) Given the following, can you prove that the Unicorn is mythical? How about magical? Horned?

``If the unicorn is mythical, then it is immortal; but if it is not mythical, then it is a mortal mammal. If the unicorn is either immortal or a mammal, then it is horned. The unicorn is magical if it is horned."

3. (6 points) Consider the following sentence

[(Food => Party) V (Drinks => Party)] => [(Food ^ Drinks) => Party]
a. Determine, using enumeration, whether this sentence is valid, satisfiable but not valid, or unsatisfiable.
b. Convert the left hand side and the right hand sides of the main implication into CNF, showing each step, and explain how the results confirm your answer to (a).
c. Prove your answer to (a) using resolution.