Problem Set #1
Due Wednesday, January 28, 2026 @ 11:59 pm
Submit as single pdf file to Canvas

Remember to review the **Guidelines for Problem Sets** *on the course Webpage!*

1. Two doors are guarded by two men, one of whom always lies and one of whom always tells the truth; however, you do not know which man is which. One of the doors leads to freedom and one to captivity.

   Determine a single question that, if asked of one of the guards, would reveal the door to freedom with certainty.

2. Let h="John is healthy", w="John is wealthy" and s="John is wise."
   For each of the following, use the symbols $\sim, \wedge, \vee$ and the letters as defined, to represent the statement.

   (a) John is healthy and wealthy but not wise.

   (b) John is not wealthy but he is healthy and wise.

   (c) John is neither healthy, wealthy, nor wise.

   (d) John is neither wealthy nor wise, but he is healthy.

   (e) John is wealthy, but he is not both healthy and wise.

3. Find the truth tables for the two possible interpretations of $p \wedge q \vee r$ and determine whether or not they are the same.

   What does this tell you about the order of operations and the importance of parentheses?

   Find another example where lack of parentheses changes the meaning.

4. Geoff Poshingten is out at a fancy pizza joint, and decides to order a calzone. When the waiter asks what he would like in it, he replies, "I definitely want peperoncini or shallots or both. Also, if I have shallots, then I must also include queso cotija. Oh, and if I have peperoncini or queso contija then I must also have rutabaga."

   (a) Translate Geoff's order into logical symbols.

   (b) Help the waiter out by listing all calzones that are acceptable to Geoff.