1. Which statement is logically equivalent to the statement “If you’re an elephant, then you do not forget”?
   (1) If you do not forget, then you are an elephant
   (2) If you do not forget, then you are not an elephant
   (3) If you are an elephant, then you forget
   (4) If you forget, then you are not an elephant

2. Complete the truth table and indicate whether or not the final statement is a tautology.
   a.) \( p \quad q \quad p \land q \quad (p \land q) \rightarrow p \)
   b.) \( p \quad q \quad \sim p \quad p \lor \sim p \quad q \rightarrow (p \lor \sim p) \)
   c.) \( p \quad q \quad q \rightarrow p \quad p \lor (q \rightarrow p) \)
   d.) (H) Construct a truth table to determine if the statement \((p \rightarrow q) \lor \sim (q \rightarrow p)\) is a tautology.

3. Complete the truth table and determine which two statements are logically equivalent
   a.) \( p \quad q \quad \sim p \quad \sim p \rightarrow q \quad p \lor q \)
   b.) \( p \quad q \quad \sim q \quad p \rightarrow \sim q \quad p \land q \quad \sim (p \land q) \)

4. (a) Translate the sentences into symbolic form using logic connectives.
   (b) Prove that the two sentences are (or are not) logically equivalent.
   Let \( f \) represent “I eat the right foods”
   Let \( s \) represent “I get sick”
   Sentences: If I eat the right foods, then I don’t get sick.
   I don’t get sick or I don’t eat the right foods.
5. Let $t$ represent “Ms. Wu is a teacher.”
   Let $d$ represent “Ms. Wu is a Dr.”

   Sentences: If Ms. Wu is a teacher, then she isn’t a Dr.
   If Ms. Wu is not a Dr., then she is a teacher.

6. Let $s$ represent “You succeed.”
   Let $t$ represent “You try again.”

   Sentences: If you don’t succeed, then you try again.
   You succeed or you try again.

7. (H) Let $m$ represent “Michael likes math.”
   Let $s$ represent “Michael like science.”

   Sentences: It is not true that Michael likes both math and science.
   Michael does not like math or Michael does not like science.

8. (H) Use the truth table for parts a, b and c.
   a. Copy and complete the truth table for the statement $\sim (p \rightarrow q) \rightarrow (p \land \sim q)$

   \[
   \begin{array}{c|c|c|c|c|c|c|c|c}
   p & q & p \rightarrow q & \sim (p \rightarrow q) & \sim q & p \land \sim q & \sim (p \rightarrow q) \rightarrow (p \land \sim q) \\
   \hline
   \hline
   \hline
   \end{array}
   \]

   b. Determine if the statement is or is not a tautology.

   c. Let $p$ represent “I have a car.” Let $q$ represent “I go to the mall.”

   Which sentence is logically equivalent to $\sim (p \rightarrow q)$?

   (a) I do not have a car or I do not go to the mall    (c) If I don’t have a car, then I don’t go to the mall
   (b) I have a car and I do not go to the mall          (d) If I don’t go to the mall, then I don’t have a car