(1) State the converse, contrapositive, and inverse of each of these conditional statements.

   (a) If it snows tonight, then I will stay at home.

   (b) I go to the beach whenever it is a sunny summer day.

(2) Explain, without using a truth table, why $(p \lor q \lor r) \land (\neg p \lor \neg q \lor \neg r)$ is true when at least one of p, q, and r is true and at least one is false, but is false when all three variables have the same truth value.

(3) Construct a truth table for the following compound statement.

$$(\neg p \leftrightarrow \neg q) \leftrightarrow (q \leftrightarrow r)$$

(4) How many rows appear in a truth table for each of these compound propositions?

$$(p \vee \neg r) \wedge (q \vee \neg s)$$

(5) Is the assertion "This statement is false" a statement?