One of the problems below will be chosen at random in class for a quiz.

1. How many rows appear in a truth table for each of these compound propositions?
   (a) \((q \rightarrow \overline{p}) \lor (\overline{p} \rightarrow \overline{q})\)
   (b) \((p \lor \overline{t}) \land (p \lor \overline{s})\)
   (c) \((p \rightarrow r) \lor (\overline{s} \rightarrow \overline{t}) \lor (\overline{p} \rightarrow v)\)
   (d) \((p \land r \land s) \lor (q \land t) \lor (r \land \overline{t})\)

2. Evaluate each of the expressions:
   (a) 11000 \land (01011 \lor 11011)
   (b) (01111 \land 10101) \lor 01000
   (c) (01010 \oplus 11011) \oplus 01000
   (d) (11011 \lor 01010) \land (10001 \lor 11011)

3. 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.
   (c) When I stay up late, it is necessary that I sleep until noon.

4. Determine whether \((\overline{r} \land (p \rightarrow q)) \rightarrow \overline{q}\) is a tautology.

5. Construct a truth table for the logical operator NAND. The operator works as follows: \(p \text{ NAND } q\) is true when either \(p\) or \(q\) or both are false. It is false when both \(p\) and \(q\) are true.

6. How many of the disjunctions \(p \lor \overline{q}, \overline{p} \lor q, q \lor r, q \lor \overline{r}\) and \(\overline{q} \lor \overline{r}\) can be made simultaneously true by an assignment of truth values to \(p, q\) and \(r\)