1. Construct a truth table for the following compound propositions:

   (a) $\neg(p \vee q)$

   (b) $\neg(p \wedge \neg(q \wedge s))$

2. (a) Using the propositions p="I study", q="I will pass the course", r="The professor accepts bribes", translate the following into statements of propositional logic:

      1. If I do not study, then I will not pass the course unless the professor accepts bribes.
      2. If the professor accepts bribes, then I will pass the course regardless of whether or not I study.
      3. The professor does not accept bribes, but I study and will pass the course.

   (b) Using the propositions p="The night hunting is successful", q="The moon is full", r="The sky is cloudless", translate the following into statements plain language:

      1. $p \rightarrow (q \wedge r)$
      2. $\neg r \leftrightarrow q$
      3. $(\neg r \wedge p) \rightarrow q$

3. Using a truth table, find which of the following compound propositions are always true (a tautology), regardless of the values of p and q:

1. $p \rightarrow (p \vee q)$

2. $p \rightarrow (p \rightarrow q)$

3. $\neg(p \rightarrow (p \vee q))$

4. Find the inverse, converse and contrapositive for the following compound propositions, then evaluate each when p is true and q is false:

1. $p \rightarrow \neg q$

2. $\neg p \rightarrow (p \vee q)$

3. $p \rightarrow (p \rightarrow q)$