1. Construct a truth table for each of the following compound proposition. (**TWO**)
   a) $(p \leftrightarrow q) \oplus (\neg p \oplus \neg r)$
   b) $(p \rightarrow q) \vee (\neg p \rightarrow r)$
   c) $(p \rightarrow q) \wedge (\neg p \rightarrow r)$
   d) $(p \leftrightarrow q) \vee (\neg q \leftrightarrow r)$
   e) $(p \leftrightarrow q) \vee (\neg q \oplus r)$

2. Let p and q be the propositions
   p: You drive over 65 miles per hour.
   q: You get a speeding ticket.
   Write these propositions using p and q and logical connectives. (**TWO**)
   a) You will get a speeding ticket if you drive over 65 miles per hour
   b) If you do not drive over 65 miles per hour, then you will not get a speeding ticket.
   c) Driving over 65 miles per hour is sufficient for getting a speeding ticket.
   d) You get a speeding ticket, but you do not drive over 65 miles per hour.
   e) Whenever you get a speeding ticket, you are driving over 65 miles per hour.

3. Find the bitwise OR, bitwise AND, and bitwise XOR of the following bit strings:

   11 0111 1001 and 10 0100 1011

4. Write each of these statements in the form "if p, then q" in English. (**TWO**)

   a) It is necessary to wash the boss's car to get promoted.
   b) Faisal gets caught whenever he cheats.
   c) You can access the website only if you pay a subscription fee.
   d) To be a citizen of this country, it is sufficient that you were born in the United States.
   e) I will remember to send you the address only if you send me an e-mail message.
   f) That you get the job implies that you had the best credentials.
   g) The beach erodes whenever there is a storm.
   h) You will reach the summit unless you begin your climb too late.
   i. It is necessary to have a valid password to log on the server.

5. Show that $p \wedge (q \vee r)$ and $(p \wedge q) \vee (p \wedge r)$ are logically equivalent using a truth table.