Math 2534   Worksheet 1 on Logic Sp 2010
Show all work

1) Given the following statements below:
         P: May goes hiking
         Q: Moose are on the trail
         R: It is raining

<u>Part A:</u>   Convert the following sentences into symbolic logic form.

    a) May goes hiking and it is raining.
    b) May goes hiking but it is not true that moose are on the trail
    c) The following statement is not true. Moose are not on the trail but May does not go hiking.
    d) It is sunny or May does not go hiking.
    e) Either it is raining or Moose are on the trail.

<u>Part B:</u>   Convert the following symbolic logic into a natural conversational English sentence.

    a) $(R \wedge Q) \vee \sim P$
    b) $\sim (P \wedge Q)$
    c) $Q \vee (P \wedge Q)$

3) Using truth tables, verify the following; (Use a detailed and labeled truth table)
    a) $w \wedge (s \vee t) = (w \wedge s) \vee (w \wedge t)$
    b) $w \wedge (w \vee t) = w$
    c) $\sim (k \vee h) = \sim k \wedge \sim h$

4) Use DeMorgan's law to find the negation of each of the following sentences.
   Put the original sentence into symbolic logic, apply DeMorgan's Law and then put into an English sentence.
    a) Laura will hike or rock climb tomorrow.
    b) Ed will study and pass his test.

5) Indicate if the following statements are Inclusive or Exclusive OR.
    a) The price of your meal will include salad or soup.
    b) In order to take this course you need to have taken math 1205 or 1206.
    c) For our vacation we have only enough days to go to the beach or to go skiing.
    d) To be considered for this job, you must have three years experience or completed a co-op internship and have a college degree.
    e) You are a college graduate or you do not have a degree.

White Water Rafting Puzzle

Eight friends decided to go white water rafting. They rented four two person rafts. The rafts are green, red, blue and yellow.   First names of the friends are Alan, Don, Frank, Henry, LeRoy, Paul, Phil, and Walt. The last names are Cook, Gladstone, Hawley, Hughes, O'Brien, Sands, Smith, and Wilson. Given the following statements which are all true **but one**, determine the first and last name of each friend and the raft each person is in. **Show your work and justify your reasoning in complete sentences.**

1. Phil and Cook, who were in the same raft, arrived at the destination without incident, but only finished next to last.
2. The red raft capsized and did not finish. The green raft finished first.
3. O'Brien and LeRoy were not on the same raft.
4. Paul and Wilson finished last on their raft.
5. Fortunately, Henry is a good swimmer, and he helped his partner, Hughes (whose first name is not Walt) get to shore. They were able to recover the raft, but decided not to finish the white water run.
6. Frank was the first to select a raft, and he picked the yellow one. He and Hawley were on the second raft to finish the run.
7. Alan and Hughes were on the same raft; they were the first to finish.
8. LeRoy and Smith completed the run and were not in last place.
9. Don and his partner, Gladstone, vowed never to set foot in another raft after their experience of capsizing.
10. Alan did not care that his raft finished last; he was just glad that they made it.