Math 2534  Homework 9

Part 1: Are the following arguments valid: Justify your conclusions referring to the sufficient and necessary conditions.

   a) John goes to the dance, then so will Ed. Ed did go, so John must have gone.

   b) If it rains then the game is off. It did not rain. Therefore the game was played.

   c) If you did not pass the course then you did not study. You did study. Therefore you passed the course.

Part 2: Prove the following using the method indicated. Give a complete write up. Do not refer to any previous theorems. Use definitions for justifications when appropriate.

1) Use direct method: ( ∀(x)Dx,P(x) → Q(x) )
   Theorem:  If n is even then 5n + 6 is even when n is an integer.

2) Use method of contrapositive: ( ∀(x)Dx,Q(x) → ¬P(x) )
   Theorem: If x is irrational then 2x is irrational.

3) Use method of contradiction. (Assume ∀(x)Dx,P(x) ∧ ¬Q(x) )
   Theorem: For any integer n, if n^3 + 5 is odd then n is even.

4) Use direct method:
   Theorem: If a|b and a|(b + c), then a|c for integers a, b, and c.

Part 3: Convert the following premises into symbolic logic and then explain your reasoning as you justify the conclusion. Use English sentences in your explanations.

If I eat ice cream, then, if the ice cream is chocolate, I eat a lot.
I eat ice cream or I eat cake.
If there is ice cream in my freezer, then it is chocolate.
I don’t eat cake.
Therefore if I don’t eat a lot, then there is no ice cream in my freezer.