CSCI 1900 - Homework 10-B

**Section 1.7, 1.8: Methods of Proof** *(28)*

In problems 1 through 5, give the symbolic form of the given argument, state whether the argument is valid or not. If it is valid, either state the name of a known form or give the truth table showing that it is a tautology. If it is not valid, give the truth table showing that it is **not** a tautology. **(3 points each)**

1. If it is springtime, then the weather is unpredictable.

It is springtime.

The weather is unpredictable.

1. If it is night time, then the boogieman comes out.

The boogieman comes out.

It is night time.

1. If it is payday, then I will party.

It is not payday.

I will not party.

1. I will eat lunch or I will play tennis.

I will not play tennis.

I will eat lunch.

1. If I fulfill all requirements, then I will get my degree.

If I get my degree, then I will become rich.

I will fulfill all requirements and I will party.

I will get rich.

1. Give the converse and the contrapositive of each of the following statements. **(2 points each)**
   1. If it is payday, then I will party.
   2. I am not awake implies that I am dreaming.
   3. If today is not a school day, then I go fishing.
   4. Getting a paycheck is necessary for me to not be broke.
2. Prove or disprove: The sum of an even number and an odd number is odd. **(1 point)**
3. Prove or disprove: For any positive integer *n*, if *n* is prime then *n* is odd. **(1 point)**
4. Prove or disprove: The difference of any two odd integers is odd. **(1 point)**
5. Prove or disprove: The difference of any two even integers is even. **(1 point)**
6. Given that n is an integer, prove that n2 is even iff (if and only if) n is even. **(1 point)**