Section 2.2/3 If-Then Statements, Converses, and Postulates and Deductive Reasoning

The **Law of Detachment** says that whenever a conditional statement is true and its hypothesis is true, we can conclude that its conclusion is true. In math lingo:

If p®q is a true conditional and p is true, then q is true.

Example 1: Assume the following conditional is true. "If a vehicle is a car, then it has four wheels." A sedan is a car. Use the law of detachment to state a valid conclusion.

Conclusion: A sedan has four wheels.

It is important to remember that to have valid reasoning, we must make sure that we remember to test the statement against the hypothesis rather than the conclusion.

Example 2: "If you like big surf, go to Oahu". John went to Oahu. Is it valid to conclude that John likes big surf? Although John may indeed like big surf, the fact that he went to Oahu satisfies the conclusion rather than satisfying the hypotheses. It is not valid to conclude that John likes big surf. He may have gone there to compete in the Ironman.

The **Law of Syllogism** states that if $p \rightarrow q$ and $q \rightarrow r$ are true conditionals, then $p \rightarrow q$ is also true.

Example 3: Given the two true statements "If Elena takes the car to the store, she will stop at the post office" and "if Elena stops at the post office, she will buy stamps." What conclusion can you make using the law of syllogism?

If Elena takes the car to the store, she will buy stamps.