MAT385 Quiz 05, Spring 2025

Name:

There are three questions (one on the back).

1. (3pts) The following purports to be a recursive definition of all well-formed formulas:

   - base cases: All statements are wffs.
   - inductive step: If P and Q are wffs, then so are $P \wedge Q$, P', and Q'.

   Is this a legitimate recursive definition of the set of all wffs? You **must** explain your answer. (And beware the kneejerk reaction!)

2. (3 pts) In class we defined palindromic strings as those which read the same backwards as forwards. An example using our alphabet would be "abba". On the binary alphabet, the base cases are "0", "1", and λ (the empty string). Then we define all palindromic strings as follows: if x and y are palindromic strings, then so is

$$xyx$$

   Question: if one forgets to include the empty string λ in the base cases, how would you characterize the kinds of palindromic strings that are missing?

3. (4 pts) Prove this property of the Fibonacci numbers directly from the definition:

$$F(n+6) = 4F(n+3) + F(n)$$