Mathematical Logic Assignment 5

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- $\exists x \forall y (P(x) \wedge T(y) \wedge F(x,y))$
- $\exists y \forall x (P(x) \wedge T(y) \wedge F(x,y))$
- If the sentence means that fooling anyone at anytime is not feasible, the wff is $\forall x \forall y (P(x) \wedge T(y) \wedge \neg F(x,y))$. If the sentence means that fooling someone all of the time is feasible but not all of the people all of the time, the wff is $\forall y \exists x (P(x) \wedge T(y) \wedge \neg F(x,y))$.

2.

- In $\forall y (P(x,y) \rightarrow \forall x P(x,y))$, the x in the first $P(x,y)$ is occurring free variable.
- In $(\neg \exists y R(f(y,z))) \wedge (\forall x \forall y R(f(y,z))$, the z at the left side of $\wedge$ is occurring free variable, and z at the right side of $\wedge$ is occurring free variables.

3. The answer is at the left sub-graph of the Figure 1.

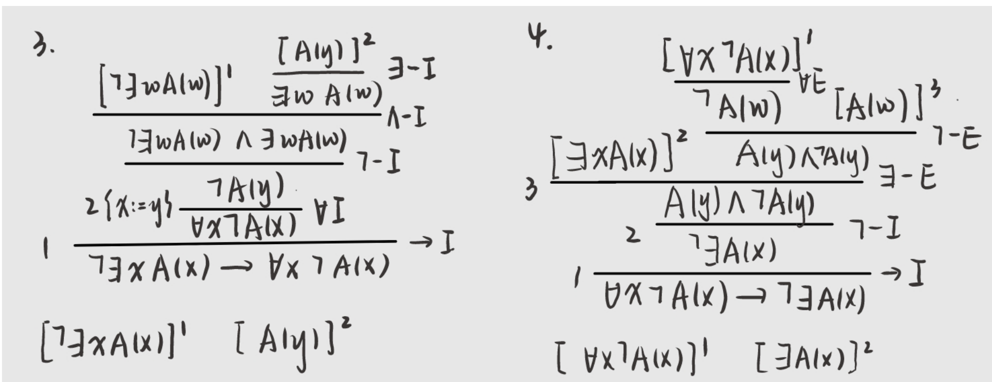

Figure 1: Left-3 Right-4

4. The wrong is the use of discharged assumption of $\exists - E$ $[A(y)]$. In the conclusion $A(y) \wedge \neg A(y)$, so y is not an occurring free variable, which can't be in discharged assumption. We should change it to $[A(w)]$ as an example, and use $\neg - E$ to prove $A(y) \wedge \neg A(y)$. The rational tree is at the right sub-graph of the Figure 1.

5. The answer is at the Figure 2.

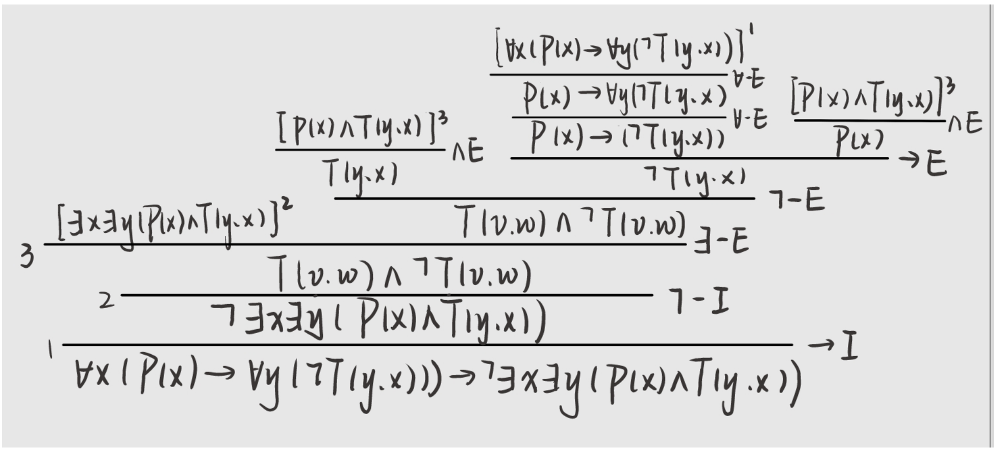

Figure 2: Question 5