PHIL 112 Homework 3

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1. Explicate in terms of open and/or closed truth trees.

   (a) Quantificational validity

   An argument of **PL** is quantificationally valid if and only if the set consisting of the premises and the negation of the conclusion of the argument has a closed truth tree.

   (b) Quantificational equivalence

   Two sentences **P** and **Q** of **PL** are quantificationally equivalent if and only if the set $\{\neg(\mathbf{P} \equiv \mathbf{Q})\}$ has a closed truth tree.

2. Use the tree method to show

   (a) quantificational truth

   (b) quantificational validity

   (c) quantificational equivalence

   (d) quantificational entailment

   (a) $[Fa \supset (\forall x)Fx] \supset [(\exists x)Fx \supset (\forall x)Fx]$

1	$[Fa \supset (\forall x)Fx] \supset [(\exists x)Fx \supset (\forall x)Fx]$	SM

   (b)
   $$\begin{array}{l} (\forall x)[Nx \supset (\exists y)Rxy] \\ \neg(\exists x)Rxx \wedge Na \\ \hline (\exists y)Ray \end{array}$$

   (c) $[(\forall x)Fx \supset Ga] \equiv (\exists x)(Fx \supset Ga)$

   (d) $\{(\forall x)[(\exists y)Hg(x,y) \supset Bg(x,x)], Ha, a = g(a,b)\} \vDash (\exists y)Bg(y,y)$

3. Why does the rule *Existential Decomposition* require that the instantiating constant **a** be foreign to all preceding lines of the branch?

   By not requiring *Existential Decomposition* to introduce foreign constants we have opened up the possibility that the same constant can be reused in a conflicting predicate. So, we require foreign constants with *Existential Decomposition* in order to preserve truth, validity, equivalence, etc.