

**Assignment #12. Due Thurs 4/28.**

1. Translate the following into  $QL^=$  (assume the domain consists of human beings).

$a \Rightarrow$  Angharad                       $F \Rightarrow$  \_\_\_ speaks Welsh  
 $b \Rightarrow$  Bryn                                 $G \Rightarrow$  \_\_\_ is a girl  
 $m \Rightarrow$  Mrs. Jones                     $L \Rightarrow$  \_\_\_ loves \_\_\_  
 $M \Rightarrow$  \_\_\_ is taller than \_\_\_

- (a) The Welsh speaker loves Mrs Jones.
- (b) Angharad loves the girl who loves Bryn.
- (c) The girl other than the girl who loves Bryn is Angharad.
- (d) The shortest Welsh speaker loves the tallest Welsh speaker.

2. Use the formal  $QL^=$  tree method to show the following arguments are  $q$ -valid.

- (a)  $m = n, Fn, \forall x(Fx \supset Gx) \therefore Gm$
- (b)  $\forall x\exists yRyx, \neg\exists xRxx \therefore \forall x\exists y(\neg x = y \wedge Ryx)$

3. Consider the following two ways of translating "The  $F$  is  $G$ ":

- (i)  $\exists x\forall y((Fy \equiv y = x) \wedge Gx)$
- (ii)  $\exists x((Fx \wedge \forall y(Fy \supset y = x)) \wedge Gx)$

Show that (i)  $q$ -entails (ii) using the formal  $QL^=$  tree method (*Hint*: Construct a tree with initial trunk consisting of (i) and not-(ii) and demonstrate that it closes.)