Homework 4

3.3

10) A) F
C) T

13) ~~There exist colors~~
For every colors, there exist an animal such that animal is colored
$\sim$ = There are animals of every color

18) $\forall x \in R, \exists$ a real number y such that $x+y=0$
For every real number x,
There exist a real number y,
Such that $x+y=0$
$\sim$ = $\exists$ a real number x such that
$\forall$ real numbers y, $x+y \neq 0$

25) $\forall$ circles x and $\forall$ squares y, x is above y
True a, b, c, Like above e, g, h, j
There exist a circle x and a square
Such that x isn't above y

33) Everybody loves somebody
For everybody e there exist somebody S
$\forall$ everybody e, $\exists$ [redacted] somebodys
such that e loves S
$\sim$ = $\exists$ somebody S such $\forall$ everybody e,
S doesn't love e

There exist a $\mathbb{R}$ real # X

34) There is a program that gives the correct answer to every question that is posed to it
$\exists$ a program P such that
$\forall$ questions Q posed to P,
P gives the correct answer to Q

n': $\forall$ programs P, there is a question Q that can be posed to P such that
P doesn't give the correct answer to Q

41) A) $\forall x \in \overset{INT}{\mathbb{Z}^+}, \exists y \in \mathbb{Z}^+$ such that $x = y+1$
Given any positive ~~INT number~~ there is a positive INT such that the ~~first~~ INT is one more than the second - false, doesn't
B) $\forall x \in \mathbb{Z}, \exists y \in \mathbb{Z}$ such that $x = y+1$
Given any INT, there is there is a positive INT such that the first is one more than second
True any number that = x, y is still an INT

3.4

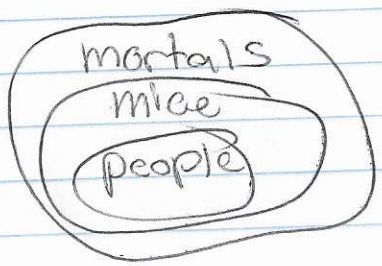
2) If an INT n equals 2k and k is an INT, then n is even $0 = 2 \cdot 0$ & 0 is an INT
0 is even

7) All healthy people eat an apple a day
Keisha eats an apple a day
∴ Keisha is a healthy person
Invalid; converse error
"so"

8) All freshmen must take writing
Caroline is a freshman
∴ Caroline must be taking writing
Valid by modus tollens (If P → Q) ~Q

19) A) ∀x, if P(x) then ~Q(x)
No good car is cheap
A Rimbaud is a good car
∴ A Rimbaud isn't cheap
Valid; modus ponens (If P → Q) ~Q

21) All people are mice
All mice are mortal
∴ All people are mortal
Valid;



23) All teachers occasionally make mistakes
No gods ever make mistakes
∴ No ~~teachers are gods~~
Valid;