(29) (37)

(1) (a) $A(x)$ → person x that qualifies as elitefl
(b) $B(x,y)$ → person x that flies more than y miles in a year
(c) $C(x,y)$ → person x that takes more than y flights in a year
* $\forall x\,(B(x,25{,}000) \vee C(x,25)) \rightarrow A(x)$

(2) (a) $A(x)$ → person that qualif for marooth
(B) $B(x)$ → person is a Man
(c) $C(x)$ → person is a Woman
(d) $D(x,y)$ → person x has men mar in less than y hours
* $\forall x((B(x) \wedge D(x,3)) \vee (C(x) \wedge D(x,3.5)) \rightarrow A(x)$

(3) (a) $A(x)$ → student
(B) $B(x)$ → masters degree
(c) $C(x)$ → student x has to take x courses
(d) $D(x,y)$ → student x has to
(e) $E(x)$ → receive a grade x in y
Stud who wrote thesis
± $A(x) \rightarrow (C(60) \vee (C(45) \wedge E(x))) \wedge \forall y\, D(B,y)$

(4) $A(x,y)$ → person x who took more than y
$B(x,z)$ → person x who received z credits
an grade

credits same person all A's

$\exists x (A(x, 21) \wedge B(x, 4.0))$

exists a unique

53)

(a) $\exists! x\, P(x) \rightarrow \exists x\, P(x)$ – True

(b) ~~$\forall x\, P(x) \rightarrow \exists! x\, P(x)$~~

more than 1x such that P(x) holds – True

(c) $\exists! x \neg P(x) \rightarrow \neg \forall x P(x)$ – True

if there's x such that P(x) is False, then it's not the case that P(x) holds for all x

59)

~~Write P(x), Q(x) and R(x) like statements~~

$P(x) \rightarrow$ x is a professor

$Q(x) \rightarrow$ x is ignorant

$R(x) \rightarrow$ x is vain

domain → all people

(1) $\forall x (P(x) \rightarrow \neg Q(x))$

(2) $\forall x (Q(x) \rightarrow R(x))$

(3) $\forall x (P(x) \rightarrow \neg R(x))$

(4) No

61)

$P(x) \rightarrow$ x is a baby

$Q(x) \rightarrow$ x is logical

$R(x) \rightarrow$ x is able to manage crocodile

$S(x) \rightarrow$ x is despised

(1) $\forall x (P(x) \rightarrow \neg Q(x))$

(2) $\forall x (R(x) \rightarrow \neg S(x))$

(3) $\forall x (Q(x) \rightarrow S(x))$

(4) $\forall x (P(x) \rightarrow \neg R(x))$

(5) No, babies cannot manage crocodiles