Lista 16

① a) $((F \to F) \to F) \to (F \to F)$

$(X \to X) \to F$
$\Downarrow R_1$
$V \to X$
$\Downarrow R_3$
$X = \text{sei, lá} \to V$
$X \to V$
$\Downarrow R_2$
Sim, claro!

$\Downarrow R_1$
V

b) $(F \to F) \to ((F \to F) \to F)$

$X \to X \qquad (X \to X) \to X$
$\Downarrow R_1 \qquad\quad \Downarrow R_1$
$V \qquad\qquad V \to X$
$\qquad\qquad\qquad \Downarrow R_3$
$V \to X = \text{sei, lá}$
$\Downarrow R_3$
$X = \text{sei, lá}$

c) $F \to (F \to (F \to (F \to F)))$

$X \to X \to (X \to (X \to X)))$
$\Downarrow R_1$
$X \to (X \to V)$
$\Downarrow R_2$
$X \to V$
$\Downarrow R_2$
$\to X \to V$!
$\Downarrow R_2$
Sim, claro!

d) $(((F \to F) \to F) \to F) \to F$

$(((x \to x) \to x) \to x) \to F$

$\quad \not\forall R1$

$((V \to x) \to x) \to X$

$\quad \not\forall R3$

$X \to X$

$\quad \not\forall R1$

$V \to X$

$\quad \not\forall R3$

$X = $ sei, lá!

② a) $(((F \to F) \to F) \to (F \to F)) \to F$

$(((x \to x) \to x) \to (x \to x)) \to X$

$\quad \not\forall R1$

$\to V$

$\quad \not\forall R2$

$V \to X$

$\quad \not\forall R3$

$X = $ sei, lá!

b) $(F \to (F \to F)) \to ((F \to F) \to F)$

$X \to (x \to x) \qquad (X \to x) \to x$

$\quad \not\forall R1 \qquad\qquad \not\forall R1$

$X \to T \qquad\qquad T \to X$

$\quad \not\forall R2 \qquad\qquad \not\forall R3$

$T \qquad \longrightarrow \qquad X$

$\quad \not\forall R3$

$X = $ sei lá.

c) $F \to (F \to (F \to (F \to (F \to F))))$

$x \to (x \to (x \to (x \to (x \to x))))$

$\forall R_1$

$x \to T$

$\forall R_2$

$x \to T$

$\forall R_2$

$x \to T$

$\forall R_2$

$x \to T$

$\forall R_2$

$T = Sim, claro!$

d) $[((F \to F) \to F) \to F] \to (F \to F)$

$x \to x$

$\forall R_1$

$x \to T.\downarrow$

$\forall R_2$

$T = Sim, claro!$