Cap. 9

1-a) $\sim p \wedge (\sim q \to p) \to q$

b) $(p \to q) \to \sim(p \wedge \sim q)$

c) $(p \to q) \wedge (\sim q \vee (r \wedge s)) \to r \wedge s$

d) $(x=y \to x=5) \wedge (x=5 \to x<z) \to x=y \to x<z$

2-a) $p, (q \vee \sim p) \vdash q$

b) $(p \to q), (p \wedge \sim q) \vdash s$

c) $\sim(x<0 \wedge y \neq x) \vdash x \geq 0 \vee y = x$

3-a) Adição

b) Simplificação

c) Silogismo hipotético

d) Modus Ponens

e) Modus Tolens

f) Conjunção

g) Silogismo Disjuntivo

h) Absorção

i) Modus Ponens

j) Modus Tolens

k) Conjunção

l) Adição

m) Silógismo Disjuntivo

n) Silogismo hipotético

o) Simplificação

4-a) $x=z$

b) $x=0$

c) $x>z$

d) $z \geq 1$

e) $y+1=2$

f) $x=y$

5-a) $x=0$

b) $x \neq z$

c) $\sim(p \leftrightarrow q)$

d) $x \leq 3$

6-a) $x \neq 4$

b) $y<b$

c) $(r \wedge t)$

d) $\sim p$

7-a) $p \to t$

b) $x=3 \to x \neq z$

c) $s \vee t \to \sim s \to t$

d) $xy=6 \to y=2$

8-a) $r \vee \sim s$

b) $x>3 \vee x<2$

c) $xy=0 \vee x>3$

d) $x^2=4 \vee y^2=9$

9-a) $\sim(p \wedge q) \vee \sim q$

b) $\sim p \vee q$

c) $x \geq 3 \vee x \leq 4$

d) $x \neq 2 \vee x \neq 8$

FORONI

Cap 10

1- $(p \to q) \wedge (r \to \sim q) \to (r \to \sim p)$ tautologia

a)

p	q	r	$(p \to q)$	$\wedge$	$(r \to \sim q)$	$\to$	$(r \to \sim p)$
V	V	V	V	V	F	V	F
V	V	F	V	F	V	V	V
V	F	V	F	F	F	V	F
V	F	F	F	F	V	V	V
F	V	V	V	V	F	V	F
F	V	F	V	F	V	V	V
F	F	V	V	V	F	V	F
F	F	F	V	V	V	V	V

b) $(p \to \sim q) \wedge (r \to p) \wedge q \to \sim r$ tautologia

p	q	r	$(p \to \sim q)$	$\wedge$	$(r \to p)$	$\wedge$	q	$\to$	$\sim r$
V	V	V	F	F	V	V	V	V	F
V	V	F	F	F	V	F	V	V	V
V	F	V	V	V	V	V	F	F	F
V	F	F	V	V	V	F	F	V	V
F	V	V	V	F	F	F	V	V	F
F	V	F	V	F	V	F	V	V	V
F	F	V	V	F	F	F	F	V	F
F	F	F	V	F	V	F	F	V	V

c) $(p \to q) \wedge (r \vee \sim q) \wedge \sim r \to \sim p$ tautologia

p	q	r	$(p \to q)$	$\wedge$	$(r \vee \sim q)$	$\wedge$	$\sim r$	$\to$	$\sim p$
V	V	V	V	V	V	F	F	V	F
V	V	F	V	F	V	F	V	V	F
V	F	V	F	F	F	F	F	V	F
V	F	F	F	F	V	F	V	V	F
F	V	V	V	V	V	V	F	V	V
F	V	F	V	F	V	F	V	V	V
F	F	V	V	F	F	F	F	V	V
F	F	F	V	F	V	F	V	V	V

d) $(p \to q \vee r) \wedge \sim q \to p \to r$ tautologia

e) $(p \to \sim q) \wedge p \wedge (\sim q \to r) \to r$ tautologia

f) $(p \wedge \sim q) \wedge (\sim r \to q) \to (p \wedge r)$ tautologia

g) $(p \vee (q \vee r)) \wedge \sim p \wedge \sim r \rightarrow q$ tautología

p	q	r	$(p \vee (q \vee r)) \wedge \sim p \wedge \sim r \rightarrow q$
V	V	V	V
V	V	F	V
V	F	V	V
V	F	F	F
F	V	V	V
F	V	F	V
F	F	V	V
F	F	F	F

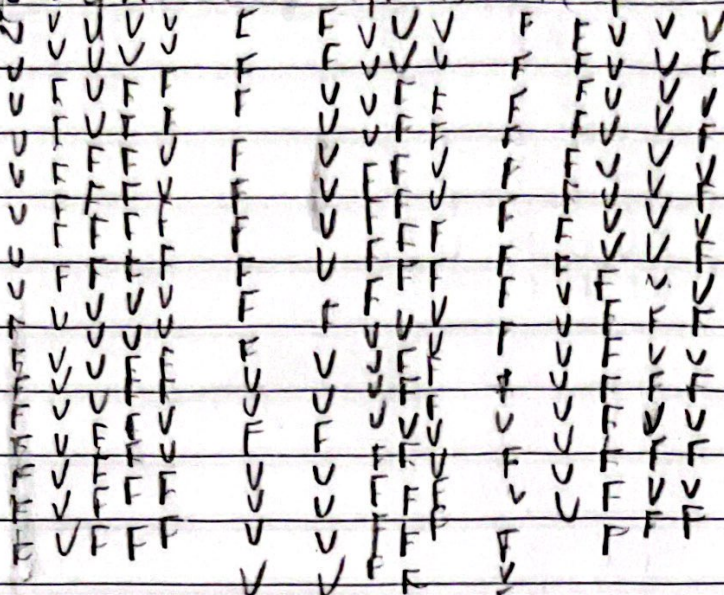
h) $(p \vee \sim q) \wedge \sim p \wedge (\sim(p \wedge r) \rightarrow q) \rightarrow r$ tautología

p	q	r	$(p \vee \sim q) \wedge \sim p \wedge (\sim(p \wedge r) \rightarrow q) \rightarrow r$
V	V	V	V
V	V	F	V
V	F	V	V
V	F	F	V
F	V	V	V
F	V	F	V
F	F	V	V
F	F	F	F

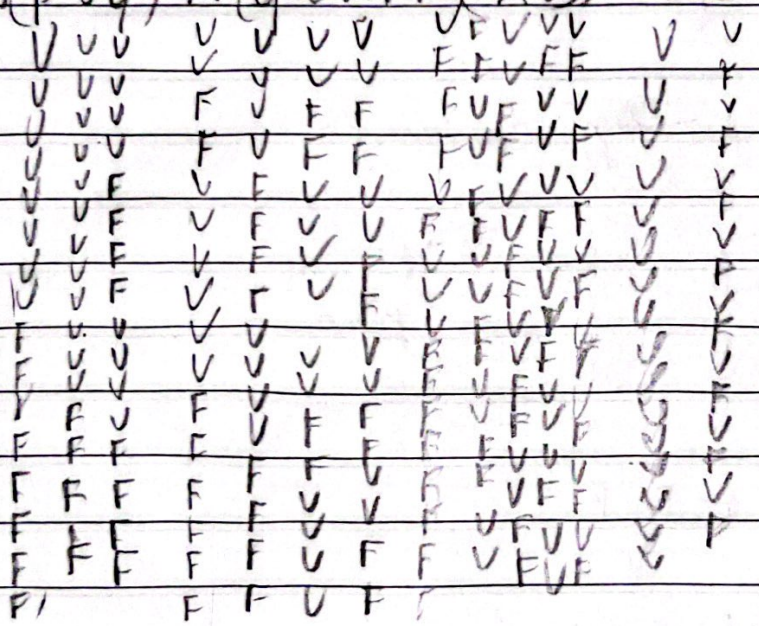
2a) $(p \rightarrow \sim q) \wedge q \wedge (\sim p \rightarrow r \wedge s) \rightarrow r \wedge s$ tautología

p	q	r	s	$(p \rightarrow \sim q) \wedge q \wedge (\sim p \rightarrow r \wedge s) \rightarrow r \wedge s$
V	V	V	V	V
V	V	V	F	V
V	V	F	V	V
V	V	F	F	V
V	F	V	V	V
V	F	V	F	V
V	F	F	V	V
V	F	F	F	V
F	V	V	V	V
F	V	V	F	V
F	V	F	V	V
F	V	F	F	V
F	F	V	V	V
F	F	V	F	V
F	F	F	V	V
F	F	F	F	F

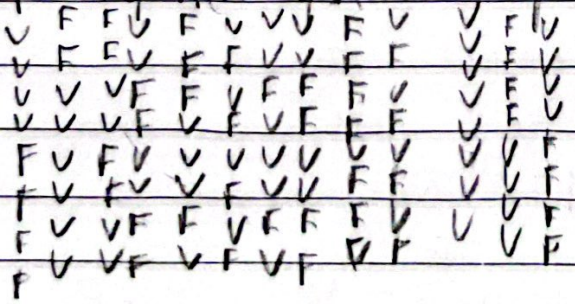
b) $(p \to q \wedge r) \wedge \sim(q \wedge r) \wedge (\sim p \to s) \to (\sim p \wedge s)$ tautología



c) $(p \vee q) \wedge (q \to r) \wedge (\sim r \vee s) \to s$ tautología

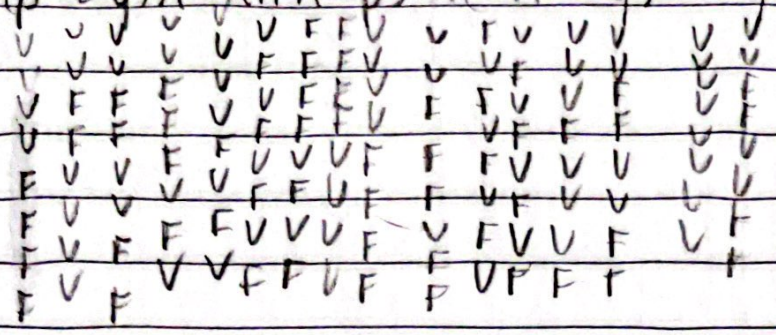


3) $(p \to \sim q) \wedge (r \to q) \wedge r \to \sim p$ tautología

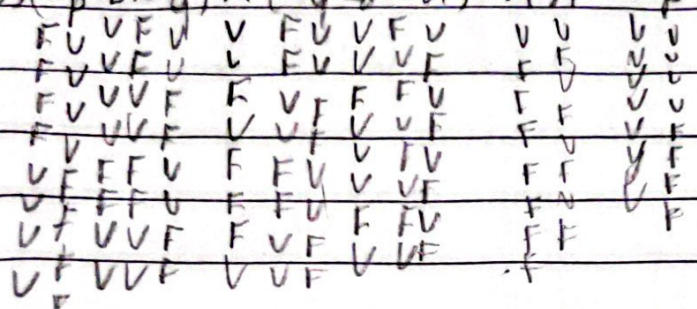


FORONI

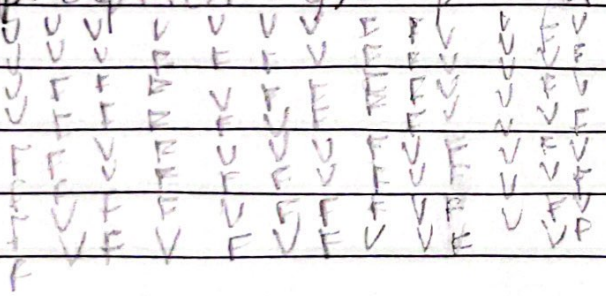
b) $(p \to q) \wedge \sim(r \wedge \sim p) \wedge (\sim r \to q) \to q$ tautologia



c) $(\sim p \to \sim q) \wedge (\sim q \to \sim r) \wedge r \to p$ tautologia



d) $(p \leftrightarrow q) \wedge (r \leftrightarrow q) \wedge \sim p \to \sim r$ tautologia



5 - $p \to \sim q$

$p \vee r$

p

r $\quad V \to \sim F, V \vee F, V \vdash F$

$\quad V \quad V \quad V \quad F$

Isso é valido

4 - a) $F \not\to F, F \to V, F \vee V \vdash F \vee F$

$\quad V \quad V \quad V \quad F$

b) $\sim(F \wedge V), \sim F \wedge \sim V \to F \wedge F, F \to F \vdash F$

$\quad V \quad V \quad V \quad F$

c) $F \leftrightarrow F \vee F, F \leftrightarrow F \vee F, F \leftrightarrow F \vee F, \sim F \vdash F \vee F$

$\quad V \quad V \quad V \quad V \quad F$

d) $V \to V \vee V, V \leftrightarrow V, \sim V \vee V \vdash \sim V \wedge V$

$\quad V \quad V \quad V \quad F$

e) $(V \to F) \to F, F \to \sim V \vee V, (V \to V) \to V, V \vdash V \to F$

$\quad F \quad V \quad V \quad V \quad F$

f) $F \to (F \to V), F \to (F \wedge V), \sim(F \wedge V) \vdash F \leftrightarrow V$

$\quad V \quad V \quad V \quad F$