Sider Axiomatic Proof Exercises 1	(1) (\$\dagger 4) \rightarrow (\rightarrow \dagger \dagger) (PC contraposition)
	(2) 0 (4-4)-0 (~4-~4) (1, NEC, K, MP)
64 K: D(D-4)- (DD-D4) KO:D(D-4)- (OD-O4)	(3) □(~4→~\$)→(□~4→□~\$) (K)
D: ¬Ф→ ФФ	(4) (D-4 - D-0) - (~D-0 - ND-4)
7: ¬Φ→ Φ + Φ + Φ + Φ + Φ + Φ + Φ + Φ + T + T +	(PL contraposition)
$B: \Diamond \Box \Diamond \rightarrow \Diamond$ $B\Diamond : \Diamond \rightarrow \Box \Diamond \Diamond$	(5) 0(0-4)- (~D~0-0004) (2,3,4, PL syllogism
54: 0¢→ 00¢ 544: ◊०¢→ ◊Φ	contraposition, Becker, K, contraposition
22: ♦DФ→ DФ 250: ♦Ф→ D♦Ф	
$mP: \phi \phi \rightarrow \psi \Rightarrow \psi$	10 FK □P→ (\$a→\$(PAa)) K, KO
$NEC: \phi \Rightarrow \Box \phi$	(1) P→(a→ (Pna)) (PC)
	(2) □P → □ (a → (P/a)) (1, MEC, K, MP)
+ K □ ((P→3)→(P→P))	$(3) \square(0 \rightarrow (6 \vee 9)) \rightarrow (0 \rightarrow 0 \rightarrow 0) \qquad (4 \Diamond )$
(,)(P-)((P-P)-P)-((P-(P-P)))-(P-P)) (PC)	(4) □P→ (40→ 4(PA)) (2,3, PL 3y(10g;3m)
(1)9) (9e-(9e-9))e-9(c)	
(3) (7→(7→(7)→(7)→(8))	11 +K 48-> (\$\frac{1}{2} = \frac{1}{2} = \fr
$(4) (P \rightarrow (P \rightarrow P)) (PCI)$	(1) 2→(P→(PA)) (PC)
(5) ?→P (3,4,mP)	(2) (13 → (1 (P→ (PV9)) (1 NEC K, MB)
(6) (P-P) - ((P-2) - (P-P)) (P(1)	$(3) \square(P \rightarrow (P \land d)) \rightarrow (P \land d)) (K \Leftrightarrow)$
(7) (7-4) - (8-7) (5,6,MP)	(4) □3→60P→((PA))) (2,3, PC = EgliogEgn))
(3) D((P-4)) - (P-4)) D(8)	(5) \$P→ (□a→ \$(PAB)) (4, PL import 1 export)
E L	(7 FK ~ DΦ → Φ ~ Φ
5 th ~ \$(PN~P) Discourse vicale	\$ 224 - 224 =
(1) ~ (PN~P) (PL LEM)	(1) ~~ \$\phi \rightarrow \$\phi\$ (PL DNE)
(2) 0~(P, ~P) (1, NEC)	(2) □~~ → □
(3) ~~ (2, PC DMI)	(2) ~ D ~ D ~ (2) Pc contraposition)
(9~√5) → =	T (o, i e comoposito)
G H_ □(PAQ) → (□PA□Q) CONJUNCTIVE CONSEQUENT	$m_{M} \vdash_{K} \sim \Diamond \varphi \to \Box \sim \varphi$
(1) (PAQ)->P (PC)	(1) who of the Color (1)
(2) □(PAB)→□P (1, NEC)	
(3) D(PNA)→DA (PL, NEC)	the Ondo woo
(4) □(PND)→(□PNDD) (2,3, Pc composition)	(1) Dud - and Dud (PC DHI)
7 + ( (DPVDA) - DI(PVA) Disjunctive antecedent	FK \$~ \$ → ~ D\$
(1) P-> (PVZ) (PL)	(1) 0- und (PC DNI)
(3) DP → D(PVB) (1, NEC, K, MP)	(2) Elp - Ound (1, NBC, K, MP)
(3) Da→ D(Ra) (PL, MEC, K, MP)	(3) ~ m ~ m d → ~ m (2, Pc controposition)
(4) (02,00) = 0(6,0) (2,3, Pc dilemma)	
	4000 € 40000 × EI
8 + (COPADA) - COPYLICATIVE CONTECTOR	(1) 5~1200 ~~ (1)
= m(BP - mBa) -> Dm (P-ma) import / (2x part	= □0□~P → ~0□0P
$(1) \stackrel{?}{?} (a \rightarrow (? \land a)) \qquad (PC)$	
(2) □P → □(a→ (Pna)) (1, NEC, K, MP)	sa +k +(PA) → (+PA+) (or junctive consequent
$(3) \ \Box(\partial \neg (P \cap \partial)) \rightarrow (\Box \partial \neg \Box(P \cap \partial)) \qquad (K)$	(1) (6/9)→ 5 (6r) \$\$ \$\$ \$\$ \$\$
(4) □P → (□B → □(PNd)) (2,3, PL = y/10q;3m)	(2) [(PA)-P) (1, NEC)
(5) $(\Box P \wedge \Box A) \rightarrow \Box (P \wedge A)$ (4, A: impaties $(B \wedge A)$ )	$(3) \square ((b \vee g) \rightarrow b) \rightarrow (\phi(b \vee g) \rightarrow \phi b)  (k \phi)$
	$(4) \Leftrightarrow (P \land B) \rightarrow \Diamond P \qquad (2, B, MP)$
9 + K □□ (649) → □□6	(5) \$\left(\manualeq) \left(\delta\right) \rightarrow \delta\right) \rightarrow \delta\right(\delta\right) \right(\delta\right) \right
(1) (PA) = P (PC)	(100) $\phi(RA) \rightarrow (RAA)$ (13)
(4M, X, X4M, 1) 4□ ←(EA9)□(C)	
(3) DD(Phd) → DDP (3, NEC, K, MP)	P + C 0~6→ D(5→9)
	(1) ~P→ (P→ a) (PL)
	(2) □~P→ □(P→a) (1, NEC, K, MP)
KC FK D(6-4)- (60-44)	

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(5) $7→ (DQ→$A) (4 PC import (export)
C +K ~ $(@NR) ↔ □(@→ ~ R)
 (1) ~ (anR) - (a-v-R) (PL)
                                                     : FK ~ 今日 (Puる) - ロロタ~P
 (3) O~(3/6)→ D(3→~8) (1 MEC K MP)
                                                         タートローロコ (アノタ) ローローロートア
 (3) ~~ CI~ (AAR) ~ D~ (AAR) (PLONE)
                                                       (1) ~~P-> (Pua) (PC)
 (4) ~ $ (a, 2) → □ (a + ~ 2) (2, 3, PL = 3/10/10/10/10)
                                                       (3) D~~ P - D (PV 3) (1, NEC, K, MP)
 (5) (an up) -> ~ (anp) (PC)
                                                       (3) NI (PUB) - INN (D, PC CONTRAPOSHION)
 (6) D(0-LE)- D~(0AR)
                              (5, MEC)
                                                       (4) DUD(Ra) - DUDULP (3, NEC, K, MP)
 (1) Un (2/8) ~ (2/8) ~ (1)
                                                       (3) (E19) 12 - (E19) and (2)
 (3) U(0-)~() ~ (6,7, PL 2410915M)
                                                       9~~ □~ □ ~ (6,9) □~ □~ (3)
 (9) ~$(QAR) +> 12(Q-12)
                                                          (4,5, PLZyllogism)
                                                       (1) DUNDUD (PLA) DUDUNP (6, NEC, K, MP)
9 FK D (549) - (D6400)
                                                       (EA) DUDIND (EA) OND MONN (8)
 (1) (P <> 3) -> (P -> 2) (PC)
                                                           (PL DNE)
 (3) D(P+3) - D(P-3) (1, NEC, K, NP)
                                                       (9) ~ $$D(P(a)> DD$ ~ P (7,8, PC = Syllogism)
 (3) \Box (P \rightarrow \partial) \rightarrow (\Box P \rightarrow \Box \partial) (K)
 (4) □ (P+> a) -> (□P -> □Q) (2, 3, PC => (100, am)
 (5) □(P+3) → (□3 → □P) (PC, NEC K NP PL SYllogISM)
 (6) □ (8+3) → (BP++03) (PC)
6 +K [a(b-a)Va(b-va)] - ~ 66
 (1) (P \rightarrow Q) \rightarrow (P \rightarrow Q) \rightarrow P) (R)
  (2) □(P→2)→□((P→~2)→~P) (1, NEC, K, MP)
  (3) D((P-100)-(P-10)-(D(P-10)-D-P) (K)
  (4) U(P-3)-(U(P-v3)- D~P)
      (2,3, PC 341)2(1311)
  (+1004x8) tadmi 74+) 4~ □ ~ [(6~~4) □ V (6~4) □ ] (5)
  (6) Dup - nudup (R DMI)
  9000 [(6009) DA(609) D] (T)
      (5,6, PC 3910915m)
F -K (DP/DB) -D (P+) a)
  (1) P→(a→ (P←a)) (PC)
  (2) DP-D(Q-) (P+3) (1, NEC, K, MP)
  (3) D(a-) (P++3))- (D2-) D(P++3)) (K)
  (4) □P→(□2 → □(P+>a)) (2,3, PC x/16q=xn)
  (5) (UPACIA) - CI(P++A) (PC:mport/export)
(B++90)+(B+9)+D)
  (1) }→ ((P→2)→ 2)
                        (PC)
  (D) DP-0 ((P-10-9)) (1, NEX, K, MP)
  (3) \ \square((P \rightarrow \lambda) \rightarrow \partial) \rightarrow (\Diamond(P \rightarrow \partial) \rightarrow \Diamond \partial) \quad (k \Diamond)
  (4) □P→($(P→a)→$a) (2,3, PL 3411051511)
  (5) \diamond (P \rightarrow A) \rightarrow (DP \leftarrow AD) \leftarrow (P \leftarrow A) \leftarrow (P \leftarrow A)
  (6) P→ (2→ (P→2)) (PC)
  (7) DP→ U(a→ (P→a)) (6, NEC, K, MP)
  (3) D(3 → (2→3)) → (23 → 4(2→3)) (K4)
  (9) DP-> (00-> (P-) (1,8 PC = yllog 5m)
  (10) (□P→40) → (P→2) (9, Pt import/export)
  (11) $(P→2) ↔ (UP→$2) (5,10 PL)
h tx 4P-> (00-100)
   (1) 2-(P-)a) (P()
   (D) 00 → 0(P → D) (1, NEC, K, MP)
   (3) D(P→Q) → (AP→AD) (KA)
   (4) U3→(4P→4a) (2,3,PC = syllagism)
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