0

 $\forall x P(x) \rightarrow \exists x P(x)$ + zutology. $\exists x P(x) \rightarrow \forall x P(x) = \emptyset$ contingency $D = \{a, b\}.$

3xP(x) - 3 \(\frac{1}{2}\) \(\

For example. 524 P(a) is true. P(b) is false. P(b) is false. P(b) is P(b).

D \(\text{X} \(\text{X} \) is false.

\[\frac{1}{2} \text{X} \(\text{X} \) is true
\[\frac{1}{2} \text{X} \(\text{X} \) -0 \(\frac{1}{2} \) \(\frac{1}{2} \) (1) \(\frac{1}{2} \) \(\f

3x(P(x), rP(x)) & contradiction. 3xP(x), 3xrP(x)? A contingency! 2

74xF = 3x7F 74x(C(x)-DT(x)) = 74x(T(x)) = 74x(T(x)) = 3x7(T(x)) = 3x7(T(x)) = 3x(T(x)) = 3x(T(x)) = 3x(T(x)) = 3x(T(x)) =

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JAXとミコノヨメノとミヨメンと 一 AX とミコヨメノと

 $7\frac{1}{2} \times (C(x), n \rightarrow T(x)) =$ $7\frac{1}{2} \times (C(x), n \rightarrow T(x)) =$ $4 \times 7 (C(x), n \rightarrow T(x)) =$ $4 \times (7C(x), n \rightarrow T(x)) =$

3x(r(x) V) (x)) 3x 2 (2r(x) V 2) 3x 2 (2r(x) Show that 3x(P(x)-0(x)) = 4x P(x)-03xQ(x) 3x(1PG) vQ(x))= 3×1P(x)V 3×Q(x) = ノAxノノら(x) 1 3×の(x) 1 Ax P(x) 1 Fx Q(x). A×3(x)-03×の(x) Tutoriz1 04 No bird is esten by a worm. 4x (B(x) => 4y (W(y) -07 E(y,x))) = (13, Ely, x) (B(x) N (y) N E(y, x)) 1) tx4y (B(x) & (w(y) +) 7 E(yx))). 4x4y (7BG) V (NG) -D7E(yx))). 4x ty (7 B(x) V 7W(y) V 7 E(y,x))} TBX773g7 (7B(x)V7W(y)V7モ(y,x)) 73×3y(77BCx)人かい(y)人かモリメン)

73×3y (B(x) ~ W(y) ~ E(y,x))

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(4)
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All penguins ere birds.

No penguin cen fly.

Tweety is = penguin.

Some birds cennot fly.

P(x) => x is = penguin.

P(x) = 7 x is 2 penguin B(x) = 0 x is 2 bird. F(x) = 0 x cen fly. tweety = 0 constant.

Yx (P(x) -D B(x))

Yx (P(x) -D B(x))

P(tweety)

Zx (B(x) ~7F(x))

1. P(tweety) dztz.

2. 4x(P(x) -> B(x)) dztz.

3. 4x (P(x)-D7F(x)) dztz.

4. P(tweety) & B(tweety) Y-E (x=tweety).

5. B(tweety) 1.4, -DE

6. P(tweety) -D7 F(tweety) 4-F (x=tweety).

7. 7F(tweety) 1,6, 78.

8. B(tweety) ~ 7 f(tweety) 5,6, NI.

9. 3x(B(x) 17F(x)) 3-I 128.

(E)	
(3.)	All interript command are Underirable (A)
B	All interret commands are underirable. (A). Some control commands are ordere: ore: Merrot commands.
Theres	pre: interest commands.
(C)	Some Control commands ere Undesirable.
	fx (Interrupt(x) -> 7 devirable(x)) (A)
	Jx(control(x) v interrupt(x)) (B)
	Jx (control(x) 1 7 desirable(x)) (c)
	(A) (dztz) (B) (dztz)
3.	control(a) , interript(a) J-E in 2.
4.	interrupt (a) - 1 desirable (a). 4-E in 1. (x=a)
5.	interript(a) n-E in 3.
6.	7 desirable (a) -nE 4,5.
(1.	Control(a) n r desirable(a) NI 6.5,6.
6.5	
8	3x (control(x) n 7devirable(x)). 3-2 in 7.
	6.5 years to go between 6. 2nd 7.)
	Added efferners!

Tutorial 5,03 VALIDITY VALID Z (3+P(+) 1 4y (P(y) ->Q(y)) -> 3z Q(z). (u) Zx P(x) 1 4y(P(y) DQ(y)) -> 4y.7Q(z) Nor VALID J ZZQ(Z) 7427 Q(z). Signose TxP(x) , ty (P(y) roly)) is the X=a (P(a) is true for some "a") Suppose From (A) P(a) must be tre (b) (ty (P(y) +) Q(y)) must be true

8 P(a) +) Q(a) true.

8 Q(a) true.

3 3=9

5 . 24 TUTORIAL. 7 = 7 = 4x(P(x) ~ (Q(y) - 1) = 4x(P(x) ~ 2y(Q(y) ~ Zy (Q(y) ~78(x,y))) 774x7 ty (7P(x) ~ (Q(y) +> R(x,y)))= 4x7 (7P(x) N 4y (Q(y) + R(x,y))) 4x (778(x) V 7 fy (Q(y) -) R(x,y))) 4x (P(x) v 773y7 (Q(y)-) R(x,y))) (5) 2 XX (P(x) V Zy (Q(y) K 7R(x,y))) Tx4y (P(x) -0 x=y) P(a) = F D={9,b} P(6) = Fty (P(a) + a=y) ! y=a (P(a) +) a=a) = T and (P(a) - D = T)P(a) = TP(b)=F Hy (P(b) → b=y). X=b >0 P(b) + b=a=7T P(b) + 5=5 =0 T.