#4 Semantics of FOL

2) I det for Fy Fz (P(x,y) \ P(z,y) \ P(x,z) \ P(x,z) \ P(z,x)).

Let the universe A be the set of natural numbers 1.

a) prodet { (m,n) | m<n}; satisfies E

Let's first look at it as $\forall x \exists y \exists z (x < y) \land (z < y) \land (x < z) \Rightarrow (z < x)$ where all 3 terms must evaluate to True for \overline{z} to be satisfied.

242	24 1	(x < 2) -> (z < x))	MAZE Bus MAXX
W.T	T	T	invalid
T	F	F	volid but false
·F	T	T	txEN, x<2 is true = invalid
F	F	T	IT when x=ZEN

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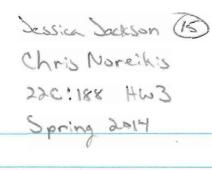
2) b) pmolet & (m, 2m) | mEA]; satisfies I

The set of natural numbers, N, is the universe A, as given. Every notural number multiplied by 2 is still in the universe of natural numbers.

c) pm get {(mm) | m < n+13}

Yx3y32(x4y+1) ~(24y+1) ~ (x42+1) → (24 ~4)))

x (24)	24×41	(242	41)->(2 (x+1)	txEN a	M3SE B
1	T	1	$(if \chi = z)$	Twhen	x=2 EN
7	F	F			
F	1	7.	(if 2 < x)	but 24x	invalid trein
_	F	1			invalid taEN
				Section 1	



#4 Semantics

3) I det txty Iz (R(x,y) > R(y,z))

A) A = {a,b,c,d} and Rodels (b,c), (b,b), (b,c)}

No. For example, let's look at the element (b,c). Then

an element (c,a) or (c,b) or even (c,d) should

belong to Rodel no such element exists in Rodel

b) A def { a, b, c } Rmdef { (b, o), (a, b), (c, b) } Yes.

(b,d) -> (c,b) here x=2.0k

(a, b) -> (b, c) OK

(g,b) 3(b,c) here x=2 again. OK