Phil 225 -- Symbolic Logic

Spring 2012

HW 1

Due Feb 3, 2012

1) Chapter 3, #1.

2a) For each of the following sentences, say whether it is true or false in the given interpretation.

D = {0,1,2,3,….}

G2: {<x,y>| x>y }

P1: {x|x is prime}

I2: {<x,y>|x = y }

S3: {<x,y,z>|x+y = z }

P3: {<x,y,z|x\*y = z }

E1: {x| x is even}

for each i, ai: i (i.e., a2: 2, a17: 17, etc.)

1. (–P3a2a3a7 <––> (–(E1a6 → – (I2a4a5 v S3a4a2a5)) ∧ – G2a6a29))
2. (G2a4a7 ∧ (P3a2a2a5 <––> – (S3a2a6a8 → – E1a17)))
3. (x)(I2xa6 → E1x)
4. (∃x)(P1x ∧ E1x)
5. (∃x)(∃y)G2xy
6. (∃x)G2xx
7. (x)(S3a16a3x → I2xa20)

2b) Determine the truth values of the same sentences under the following interpretation.

 D = {Alice, Bob, Carmen, Donald, Euphigene}

 G2: {<Alice, Bob>, <Carmen, Carmen>, <Carmen, Donald>}

 P1: {Bob, Euphigene, Donald}

I2: {<Bob, Alice>, <Donald, Bob>}

S3: Ø (the empty set)

P3: {<Alice, Alice, Bob>, <Bob, Alice, Donald>, <Carmen, Carmen, Carmen>}

E1: {Donald, Alice, Carmen}

a2: Bob

a3: Alice (more on reverse side)

a4: Donald

a5: Carmen

a6: Bob

a7: Euphigene

a8: Euphigene

a16: Carmen

a17: Bob

a20: Alice

a29: Alice