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**First Midterm  
Philosophy 112  
Winter 2005**

Answer the following questions in the spaces below them. You may use scratch paper.

1. For each of the underlined expressions, state whether the expression is being used as part of the metalanguage, mentioned as part of the metalanguage, used as part of the object language, or mentioned as part of the object language. 5 points each.

a.  $\langle d[\text{Eve}/x](x), v(a) \rangle$  satisfies 'Lxa'.

b. If 's' indicates the constant 'a', then 'Lea' can be represented as 'P(s)'.

2. Which of the following facts are semantical facts, and which are syntactical facts? 5 points each.

a. Premises:  $(\exists x)Fx, (\exists x)Gx$ ; Conclusion:  $(\exists x)(Fx \ \& \ Gx)$ .

b. **d** satisfies 'Ga'.

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3. Using the transcription guide on the last page of this exam, transcribe the following sentences of Predicate Logic into colloquial English. 10 points each.

a.  $(\exists x)(Ox \ \& \ Gf(x,o)t)$ .

b.  $(\forall x)((Ox \ \& \ \sim Gxw) \supset x = o)$ .

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4. Using the transcription guide on the last page of this exam, transcribe the following sentences of English into Predicate Logic. 10 points each

a. The sum of one and three is greater than the sum of one and two.

b. No positive integer that is not odd is greater than 2.

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5. Using the transcription guide on the last page of this exam, determine the truth-values of the following sentences, and show how you arrived at them. 10 points each.

a.  $(\forall x)Gf(x,o)x$ . (Use any method.)

b.  $\sim(\exists x)(Ox \ \& \ \sim Gxw)$ . (Use formal semantics.)

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6. Evaluate the following arguments of Predicate Logic for validity. If the argument is invalid, give a counterexample in the formal semantics. If it is valid, show why it is so (using the formal semantics or not). 10 points each.

$(\forall x)(Fa \vee Gx)$

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 $(\forall x)Gx \vee Fa$

$(\exists x)Fx \supset (\exists x)Gx$

Fa

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Ga

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Transcription guide for problems 3-5 (tear-off).

Domain: {x: x is a positive integer}

o: one

w: two

t: three

Ox: x is odd

Gxy: x is greater than y

$f(x,y)$ : the addition function,  $x + y$