

Philosophy 240, Kenny Easwaran

Sample Final 2

December, 2017

Name: _____

Section: _____

1. Validity. Make up an argument with the described premises and conclusion, or say why such an argument is impossible. (5 pts each)

(a) Valid, with two false premises, and a true conclusion.

(b) Valid, with two true premises, and a false conclusion.

(c) Invalid, with one false premise, one true premise, and a false conclusion.

2. Translations

(a) Translate the following sentences from English into the formal language of Tarski's World. (5 points each)

i. b is not a large cube if c is.

ii. a is either larger than b or the same size as it.

iii. c and d aren't both small.

(b) Give ordinary English translations of the following sentences in the formal language of Tarski's World. (5 points each)

i. $\text{Tet}(a) \wedge \neg \text{Small}(a)$

ii. $(\text{Large}(b) \wedge \text{Cube}(b)) \rightarrow (\text{Medium}(c) \wedge \text{Cube}(c))$

iii. $(\text{Cube}(d) \wedge \text{Small}(d)) \vee (\text{Cube}(a) \vee \text{Small}(a))$

(c) Translate the following sentences from English into the formal language of Tarski's World. (5 points each)

i. Not everything larger than c is a cube.

ii. Some cube is larger than b if c is larger than every tetrahedron.

iii. There is something to the left of d that is larger than something to the right of d .

(d) Give ordinary English translations of the following sentences in the formal language of Tarski's World. (5 points each)

i. $\exists y(\text{Small}(y) \wedge \neg \text{Tet}(y))$

ii. $\forall z(\text{SameSize}(z, b) \rightarrow \text{Cube}(z)) \vee \forall z(\text{Larger}(z, b) \rightarrow \text{Cube}(z))$

iii. $\forall x(\text{Larger}(x, a) \rightarrow \exists z(\text{Cube}(z) \wedge \text{SameRow}(z, x)))$

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3. Assessing arguments

- (a) Construct a truth table for this argument and use it to state whether the argument is tautologically valid. (15 points)

$C \rightarrow \neg B$. $A \vee C$. Therefore, $B \vee \neg A$.

- (b) Fill in the rules and line numbers for this formal proof. (15 points)

1	$\neg B \vee (A \rightarrow C)$	_____
2	$B \wedge A$	_____
3	$\neg B$	_____
4	B	_____
5	$\perp$	_____
6	C	_____
7	$A \rightarrow C$	_____
8	A	_____
9	C	_____
10	C	_____
11	$(B \wedge A) \rightarrow C$	_____

- (c) Say whether or not this argument is valid. If it is valid, explain why, and if it is not valid, show this by describing a counterexample. (15 points)

$\forall z(\text{Dodec}(z) \rightarrow \neg \text{Small}(z)). \text{Small}(b). \text{Therefore, } \neg \text{Dodec}(b).$

- (d) Say whether or not this argument is valid. If it is valid, explain why, and if it is not valid, show this by describing a counterexample. (15 points)

$\exists x \text{Small}(x). \exists x \text{Tet}(x). \text{Therefore, } \exists x(\text{Small}(x) \wedge \text{Tet}(x)).$

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- (e) Mary is going to the doctor for her annual cancer screening. She knows that 1% of all women her age develop cancer in a given year. The doctor has given her a test that has a 90% chance of coming back positive if she does have cancer, and a 5% chance of coming back positive if she doesn't. What is the probability that she has cancer, given that her test comes back positive? How strong is this evidence as an argument that she has cancer? (15 points)