

## Philosophy 220A: Symbolic Logic I

Department of Philosophy  
Instructor: Richard Johns

### Answers to Problem Set 1

[Total: 82 marks]

1. [1 mark for each underline/highlight/identity, 22 total.]

- (i) Janet is one of my cousins.
- (ii) Sid Crosby = the best hockey player in 2010.
- (iii) Alan's mother is taller than his father.
- (iv) If Dick shaves himself, then he needs to get a new razor.
- (v) When the price of a commodity increases, consumption of it falls.
- (vi) The reason I'm angry at you is that you insulted my mother's favourite cousin

[Take marks off for annotating too much as well, at your discretion. Don't be too picky, though – give students the benefit of any doubt.]

2. [1 mark each, 12 total]

- T 1. Cube(a)

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- T 2. Tet(c)

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- T 3. Larger(c, e)

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- T 4. Small(d)

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- T 5. Adjoints(d, a)

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- T 6.  $a = e$

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- T 7. SameRow(a, c)

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- T 8. Between(e, d, c)

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- T 9. Dodec(d)

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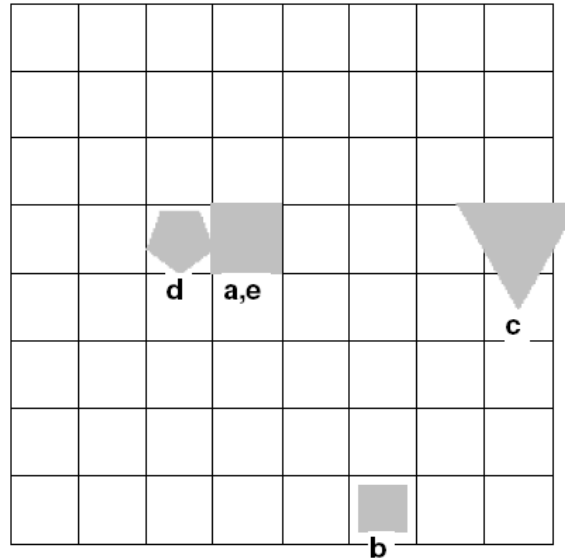
- T 10. LeftOf(d, a)

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- T 11. Larger(a, d)

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- T 12. FrontOf(b, c)



3. [8 marks for world shown, or similar]

4. [2 marks each]

- (i) Dentist(mother(george)).
- (ii) Aunt(mother(george), rachel)
- (iii) mother(george) = mother(alice)
- (iv) Pretty(nose(mother(alice)))

5. [2 marks each]

- (i) Rachel is Fred's mother
- (ii) Alice's maternal grandmother is pretty.
- (iii) Alice is Fred's aunt
- (iv) George prefers Alice's mother's nose to Fred's nose.

6. [3 marks each for identifying premises and conclusion]

(i) Valid.

If the Canucks lose the game, Fred will be too depressed to do his homework tonight.  
If the Canucks win the game, then Fred will go out and celebrate tonight rather than study.  
There are no tied games in the NHL.

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Fred will not do his homework tonight

(ii) Valid

If God were perfectly good he would want to eliminate all evil.  
If God were all-powerful he would do whatever he wanted.  
Evil exists.

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God isn't both perfectly good and all-powerful

(iii) Invalid

All philosophers are smokers  
Most smokers are unfit

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Most philosophers are unfit.

(If you think the argument is valid, then consider the parallel argument: "All penguins are birds, and most birds fly. Therefore most penguins fly.")

(iv) Invalid

Nothing can be obtained without someone working

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Capitalism is an unjust economic system

(v) Valid

If Fred had caught the bus, then unless he had a wooden leg he would be here by now.  
Fred is not here  
Fred doesn't have a wooden leg.

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Fred missed the bus.

(vi) Invalid

If medicine doesn't taste nasty, then it isn't good

This medicine tastes nasty

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This medicine is good

(Again, if it looks valid, then consider: "If this is not a bird, then it isn't a penguin. It is a bird. Therefore it's a penguin.)

7. [1 mark each for identifying as valid/invalid]