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Spring 2014

22C: 019 Homework 1

∧∨¬→↔∃∀

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8.

a. All rabbits hop.

b. There is a rabbit that hops

10.

c. ∃x(C(x) ∧ F(x) ∧ ¬D(x))

d. ¬∃x(C(x) ∧ D(x) ∧ F(x))

12.

d. True

f. True

16.

c. True

d. False

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24.

a. ∀x(F(x) ∧ C(x)) where C(x) x has a cellphone

c. ∃x(F(x) ∧ ¬S(x)) where S(x) x can swim

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20.

b. ∀x∀y((x<0)∧(y<0)→(xy>0))

c. ∀x∀y(abs(x+y)≤(abs(x)+abs(y)))

32.

a. ∀z∃y∃x¬T(x,y,z)

b. ∀x∀y¬P(x,y) ∨ ∃x∃y¬Q(x,y)

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8. Let n = a^2, if a = 0, then n+2 = 0+2 which isn’t a perfect square. a has to be greater or equal than 1. The smallest perfect square is (a+1)^2.

(a+1)^2 = a^2+2a+1 = n+2a+1 ≥ n+2+1 >n+2

24. If we choose 2 days, it would account for almost 2.12, which equals 24 days, but we chose 25 days. This shows that at least 3 of the days must be on the same month.

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4.

a. {a,b,c,de,f,g,h}

b. {f,g,h}