

San Jose State University  
Department of Mathematics, College of Science  
Fall 2009  
MATH 42, Discrete Mathematics  
Answers of HW2

Please ask if you do not understand the answers.

Please report if you find any errors, typos.

**1.3 # 2**

- a) T
- b) F
- c) F
- d) T

**1.3 # 8**

- a) for any animal  $x$ , if  $x$  is a rabbit then  $x$  hops
- b) for any animal  $x$ ,  $x$  is a rabbit and  $x$  hops
- c) there exists an animal  $x$ , if  $x$  is a rabbit then  $x$  hops
- d) there exists an animal  $x$ ,  $x$  is a rabbit and  $x$  hops

**1.3 # 9**

- a)  $\exists x(P(x) \wedge Q(x))$
- b)  $\exists x(P(x) \wedge \neg Q(x))$
- c)  $\forall x(P(x) \vee Q(x))$
- d)  $\neg \exists x(P(x) \vee Q(x))$

**1.3 # 15**

- a) T
- b) F
- c) T
- d) F

**1.3 # 36**

- a)  $x = 0$
- b)  $x = \sqrt{2}$
- c)  $x = 0$

**1.4 # 4**

- a) A student in your class has taken a computer science course at your school.

- b) A student in your class has taken all computer science courses at your school.
- c) Every student in your class has taken a computer science course at your school.
- d) There is a computer science course at your school which is taken by every student in your class.
- e) Every computer science course at your school is taken by a student in your class.
- f) Every student in your class has taken all computer science courses at your school.

**1.4 # 7**

- a) Abdallah Hussein does not like Japanese cuisine.
- b) Some students at your school like Korean cuisine and every student at your school likes Mexican cuisine.
- c) There is a cuisine that either Monique Arsenault or Jay Johnson likes.
- d) For any two different students, there is a cuisine that one of them does not like it.
- e) There are two students who have exactly same taste.
- f) For any two students there is a cuisine that either they both like it or both do not like it.

**1.4 # 9**

- a)  $\forall xL(x, Jerry)$
- b)  $\forall x\exists yL(x, y)$
- c)  $\exists y\forall xL(x, y)$
- d)  $\neg\exists x\forall yL(x, y)$
- e)  $\exists y\neg L(Lydia, y)$
- f)  $\exists y\neg\forall xL(x, y)$
- g)  $\exists y\forall z\{[\forall xL(x, y)] \wedge [\forall wL(w, z) \rightarrow z = y]\}$
- h)  $\exists x\exists y\forall z[L(Lynn, x) \wedge L(Lynn, y) \wedge (x \neq y) \wedge (L(Lynn, z) \rightarrow ((z = x) \vee (z = y)))]$
- i)  $\forall xL(x, x)$
- j)  $\exists x\forall y(L(x, y) \leftrightarrow x = y)$

**1.4 # 26**

- a) F
- b) T
- c) F
- d) F
- e) T
- f) T
- g) T
- h) F

i) F

**1.4 # 28**

a) T

b) F

c) T

d) F

e) T

f) F

g) T

h) F

i) F

j) T