

Name (last, first): _____

CS 201 Discrete Structures

Things to remember!

Number types –

Chapter 1: Logic and Proofs

1.4 Predicates and Quantifiers

Subject and Predicate:

What is a Propositional Function?

- How is the predicate represented?
- How is the subject represented?

P. 53 #1(a-c): True or False?

P(x) denotes “ $x \leq 4$ ”		
a. P(0)	b. P(4)	c. P(6)

P. 53 #2(a-d): True or False?

P(x) denotes “the word contains the letter a”				
a. P(orange)	b. P(lemon)	c. P(true)	d. P(false)	Bonus: P(Apple)

Multiple Variables:

$x = y - z$	
Q(1,3,2)	
Q(8, 5,3)	
Q(3, 2,-1)	
Q(-3,-2,1)	

How does this apply to Computer Science?

Precondition:

Postcondition:

P. 53 #4 (a-c)

a. $x=0$	b. $x=1$	c. $x=2$
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Predicate Calculus

Quantifiers:

Universal Quantification:

Domain:

Counterexample:

Existential Quantification:

P. 53 # 11 (a-f):

P(x) where $x=x^2$	
domain: integers	
a.	d.
b.	e.
c.	f.

P. 53 # 12 (a-g):

Q(x) where $x+1 > 2x$	
domain: integers	
a.	e.
b.	f.
c.	g.
d.	

P. 53 # 13(a-d):

a. $\forall n (n+1 > n)$	
b.	
c.	
d.	

P. 53 # 17(a-f):

Write out the proposition using disjunction, conjunction, and negations.

domain of $p(x)$ is the integers 0,1,2,3,4

a. $\exists x P(x)$

b.

c.

d.

e.

f.

P. 54 # 19(a-e):

Write out the proposition using disjunction, conjunction, and negations.

domain of $p(x)$ is the integers 1,2,3,4,5

a.

b.

$\forall x P(x)$

c.

d.

e.

P. 54 # 31(a-d):

Write out the propositions using disjunctions and conjunctions

$x=0,1, \text{ or } 2$

$y = 0 \text{ or } 1$

$z = 0 \text{ or } 1$

a.

$\forall y Q(0,y,0)$

b.

c.

d.

P. 55 # 35 (a-c)

Domain: ALL INTEGERS

a. $\forall x (x^2 \geq x)$

b.

c.