

Math 374

Practice Test 1

- 1) Write the negation of each statement
- If the food is good, then the service is excellent.
 - Either the food is good, or the service is excellent.
 - If the price is high, then the food is good and the service is excellent.
- 2) Using Letters for the component statements, translate the following compound statements into symbolic notation
- If prices go up, then housing will be plentiful and expensive but if housing is not expensive, then it will still be plentiful. (G = "go up", P = "plentiful", E = "Expensive")

3) Construct a truth table for the following wff.

$$(A \vee B') \wedge (A \rightarrow B)$$

4) Construct a proof sequence for the following wff.

$$(P \vee Q') \wedge (P' \vee R) \rightarrow (Q' \vee R)$$

5) Construct a proof Sequence for the following wff.

$$A \wedge (B \rightarrow C) \wedge [(A \wedge B) \rightarrow (D \vee C')] \wedge B \rightarrow D$$

6) Write the following statements in Symbolic notation where

$B(x)$ = "x is a Bear" $S(x)$ = "x is a Salmon" $E(x,y)$ = "x eats y"

a) All bears eat all salmon

b) Some bears eat all salmon

c) Only bears eat salmon.

7) Give a proof sequence for the following valid wff.

$$(\exists x) P(x) \wedge (\forall x) (P(x) \rightarrow Q(x)) \rightarrow (\exists x) Q(x)$$

8) Using a domain of interpretation, show that the following wff is not valid.

$$(\forall x) [P(x) \rightarrow Q(x)] \rightarrow [(\exists x) P(x) \rightarrow (\forall x) Q(x)]$$

9) Translate the following paragraph into a symbolic statement, where
 $O(x,y)$ = "x owns y" $F(x)$ = "x is a farmer" $C(x)$ = "x is a cow" $D(x)$ = "x is a dentist"
- Every farmer owns a cow. No dentist owns a cow. Therefore,
no dentist is a farmer.

- 10) Show that the following program is correct, where the precondition is $P = \{x=a \text{ and } y=b \text{ and } z=c\}$ and the postcondition is $Q = \{x=c \text{ and } y=a \text{ and } z=b\}$

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temp = x
x = z
z = y
y = temp
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- 11) Show that the following program is correct, with given pre and postcondition

$\{x=7\}$

if $x \geq 0$ then

$y = x$

else

$y = 2x$

endif

$\{y=7\}$