

September 4, 2008

Quiz 1

Name: Solution Key

1. Construct the truth table for the proposition
- $(p \rightarrow q) \wedge (\neg p \rightarrow q)$
- .

p	q	$p \rightarrow q$	$\neg p \rightarrow q$	$(p \rightarrow q) \wedge (\neg p \rightarrow q)$
T	T	T	T	T
T	F	F	T	F
F	T	T	T	T
F	F	T	F	F

2. State the converse and the contrapositive of the conditional statement: "I come to class if there is going to be a quiz."
-
- (Specify which one is which.)

Original: If there is going to be a quiz, then I come to class.

Converse: If I come to class, then there is going to be a quiz.

Contrapositive:

If I don't come to class, then there is not going to be a quiz.

3. 1) Express the statement "Someone in this class knows Russian" as a logical statement using quantifiers, 2) Form the negation of the logical statement, and 3) Express the negation as an English sentence.

Solution 1

$P(x) \equiv$ "Student x knows Russian."

X - set of students in the class.

$\exists x \in X (P(x))$

Negation: $\neg \exists x \in X (P(x)) \equiv \forall x \in X (\neg P(x))$

"Every student in this class does not know Russian."

Solution 2

$\exists x ((x \in X) \wedge P(x))$

Negation:

$\forall x (\neg (x \in X) \vee \neg P(x)) \equiv \forall x ((x \notin X) \vee \neg P(x))$

"A student is not in this class or the person does not know Russian"

\equiv "None in the class knows Russian"