M260 2.1

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Logical Form and Logical Equivalence

New terms in mathematics are defined using _____.

How are Initial terms defined?_____.

Undefined terms in logic are: _____, _____, and _____.

A statement or proposition is a sentence that is _____

but not _____.

~p is called the _____ of p.

$p \wedge q$ is called the _____ of p and q.

$p \vee q$ is called the _____ of p and q.

Truth tables for negation, conjunction, and disjunction:

p	~p

p	q	$p \wedge q$

p	q	$p \vee q$

A Statement form is an expression made up of _____ and

_____. A truth table can be used with a statement form to show truth values that correspond to different combinations of the truth values for the variables.

Truth table for “exclusive or”:

Two statement forms are <u>logically equivalent</u> if _____

_____.

Truth table showing ~(p∨q) ≡ ~p ∧ ~q

For statement variables p, q, r, tautology t, and contradiction c, find logical equivalents of the following:

p∧q ≡_____ p∨q ≡ _____

(p∧q)∧r ≡_____ (p∨q)∨r ≡_____

p∧(q∨r) ≡ _____ p∨(q∧r) ≡ _____

p∧t ≡_____ p∨c ≡ _____

p∨~p ≡ _____ p∧~p ≡ _____

~(~p) ≡ _____

p∧p ≡ _____ p∨p ≡ _____

~(p∧q) ≡ _____ ~(p∨q) ≡ _____

p∨t ≡ _____ p∧c ≡ _____

p∨(p∧q) ≡ _____ p∧(p∨q) ≡ _____

~t ≡ _____ ~c ≡ _____