CS113/DISCRETE MATHEMATICS-SPRING 2024

Worksheet 1

Topic: Logical Connectives And Truth Tables

Use the given table to construct the truth table for the given compound propositions.
Happy Learning!

Student's Name and ID: _____

Instructor's name: _____

1 Truth Table For Logical Connectives

p	q	$p \wedge q$	$p \vee q$	$p \rightarrow q$	$p \iff q$
T	F	F	T	F	F
T	T	T	T	T	T
F	T	F	T	T	F
F	F	F	F	T	T

1. Construct a truth table for:

$$(p \rightarrow q) \wedge (\neg p \iff q)$$

2. Construct a truth table for:

$$(\neg p \iff \neg q) \iff (p \iff r)$$

3. Construct a truth table for:

$$((p \rightarrow q) \rightarrow r) \rightarrow s$$

Follow up: Can you think of a way to determine the number of rows in a truth table by knowing exact number of propositions?

4. Explain, without using a truth table, why

$$(p \vee \neg q) \wedge (q \vee \neg r) \wedge (r \vee \neg p)$$

is true when p, q, and r have the same truth value and it is false otherwise.