Foundation
of Mathematics I

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Dr. Bassam Al-Asadi and Dr. Emad Al-Zangana

Course Outline
First Semester

1.2. Truth Table

1.2.1. What is a Truth Table?

(i) A truth table is a tool that helps you analyze statements or arguments (defined later) in order to verify whether or not they are logical, or true.

(ii) A truth table of a logical proposition shows the condition under which the logical proposition is true and those under which it is false.

There are six basic operations called **connectives** that you will utilize when creating a truth table. These operations are given below.

English Name	Math Name	Symbol
"and"	Conjunction	$\wedge$
"or"	Disjunction	$\vee$
"Exclusive"= "or but not both"	xor	$\underline{\vee}$
"if … then"	Implication	$\rightarrow$
"if and only if"	equivalence	$\leftrightarrow$
"not"	Negation	$\sim$

Definition 1.2.2. (Compound Statement)

If two or more logical propositions compound by connectives called compound proposition (statement).

The rules for these connectives (operations) are as follows:

AND (∧) (conjunction): these statements are true only when both p and q are

AND ∧ (Conjunction)		
p	q	p ∧ q
T	T	T
T	F	F
F	T	F
F	F	F

OR (∨) (disjunction): these statements are false only when both p and q are false.