

SYMBOLIC LOGIC

UNIT 5:

TRUTH TABLES

FOR TESTING

VALIDITY

SYMBOLIC LOGIC

UNIT 6: FURTHER

APPLICATIONS

OF THE TRUTH

TABLE METHOD

4 Truth Table Skills:

- Testing whether an argument form is **valid**.
 - (Equivalently: testing whether one or more statements **logically imply** another.)
- Testing whether a statement form is a **tautology**, a **contradiction**, or a **contingency**.
- Testing whether two statement forms are **logically equivalent**.
- Testing whether two or more statement forms are **consistent** or **inconsistent**.

1. How many rows will there be in the truth table for

$$[(p \vee \sim q) \vee [(r \supset (s \cdot r)) \supset (t \cdot \sim p)]] \equiv (w \supset q \vee s)?$$

<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>w</i>
T	T	T	T	T	T
T	T	T	T	T	F
T	T	T	T	F	T
T	T	T	T	F	F
T	T	T	F	T	T
T	T	T	F	T	F
T	T	T	F	F	T
T	T	T	F	F	F
T	T	F	T	T	T
T	T	F	T	T	F
T	T	F	T	F	F
T	T	F	F	T	T
T	T	F	F	T	F
T	T	F	F	F	T
T	T	F	F	F	F
T	F	T	T	T	T
T	F	T	T	T	F
T	F	T	T	F	T
T	F	T	T	F	F
T	F	T	F	T	T
T	F	T	F	F	F
T	F	T	F	F	T
T	F	F	T	T	T
T	F	F	T	T	F
T	F	F	T	F	T
T	F	F	T	F	F
T	F	F	F	T	F
T	F	F	F	F	T
T	F	F	F	F	F
F	T	T	T	T	T
F	T	T	T	T	F
F	T	T	T	F	T
F	T	T	T	F	F
F	T	T	F	T	F
F	T	T	F	F	T
F	T	T	F	F	F
F	T	F	T	T	T
F	T	F	T	T	F
F	T	F	T	F	T
F	T	F	T	F	F
F	T	F	F	T	T
F	T	F	F	T	F
F	T	F	F	F	T
F	T	F	F	F	F
F	F	T	T	T	T
F	F	T	T	T	F
F	F	T	T	F	T
F	F	T	F	T	T
F	F	T	F	F	T
F	F	T	F	F	F
F	F	F	T	T	T
F	F	F	T	T	F
F	F	F	T	F	T
F	F	F	T	F	F
F	F	F	F	T	T
F	F	F	F	T	F
F	F	F	F	F	T
F	F	F	F	F	F

$p, p \supset q \therefore q$

p	q	p	$p \supset q$	q
T	T	T	T	T
T	F	T	F	F
F	T	F	T	T
F	F	F	T	F

1b. $p \supset q, \sim p \therefore \sim q$

p	q	$p \supset q$	$\sim p$	$\sim q$
T	T			
T	F			
F	T			
F	F			

1c. $p \vee q, \sim p \vee \sim q \ /:\!:\ \sim p \equiv \sim q$

p	q	$p \vee q$	$\sim p \vee \sim q$	$\sim p \equiv \sim q$
T	T			
T	F			
F	T			
F	F			

1c. $p \vee q$

$\sim p \vee \sim q$

$\therefore \sim p \equiv \sim q$

p	q	r	$p \vee q$	$\sim p \vee \sim q$	$\sim p \equiv \sim q$
T	T	T			
T	T	F			
T	F	T			
T	F	F			
F	T	T			
F	T	F			
F	F	T			
F	F	F			

p	q	
T	T	
T	F	
F	T	
F	F	

p *q* *r*

T T T

T T F

T F T

T F F

F T T

F T F

F F T

F F F

p	q	r	s	
T	T	T	T	
T	T	T	F	
T	T	F	T	
T	T	F	F	
T	F	T	T	
T	F	T	F	
T	F	F	T	
T	F	F	F	
F	T	T	T	
F	T	T	F	
F	T	F	T	
F	T	F	F	
F	F	T	T	
F	F	T	F	
F	F	F	T	
F	F	F	F	