

Introduction to Logical Reasoning

Workshop on Assessing Arguments
With Truth Tables

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Part I, Problem 1 Solution

$$1. p \rightarrow (q \& r)$$

$$2. \sim p$$

$$\therefore \sim r$$

Premise 1 Premise 2 Conclusion

p	q	r	$q \& r$	$p \rightarrow (q \& r)$	$\sim p$	$\sim r$
T	T	T	T	T	F	F
T	T	F	F	F	F	T
T	F	T	F	F	F	F
T	F	F	F	F	F	T
F	T	T	T	T	T	F
F	T	F	F	T	T	T
F	F	T	F	T	T	F
F	F	F	F	T	T	T

Invalid!

Part I, Problem 2 Solution

$$1. \quad p \vee q$$

$$2. \quad \sim p$$

$$\hline \therefore q$$

This is a common argument pattern known as the **disjunctive syllogism**.

Conclusion

Premise 1

Premise 2

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

Valid!

Part I, Problem 3 Solution

1. $p \rightarrow q$
2. $q \rightarrow r$

 $\therefore p \rightarrow r$

This is a common argument pattern known as the **hypothetical syllogism**.

p	q	r	$p \rightarrow q$	$q \rightarrow r$	$p \rightarrow r$
T	T	T	T	T	T
T	T	F	T	F	F
T	F	T	F	T	T
T	F	F	F	T	F
F	T	T	T	T	T
F	T	F	T	F	T
F	F	T	T	T	T
F	F	F	T	T	T

Premise 1 points to the $p \rightarrow q$ column.
Premise 2 points to the $q \rightarrow r$ column.
Conclusion points to the $p \rightarrow r$ column.

Valid!

Part 2, Problem 1 Solution

1. $K \vee A$.

2. $K \rightarrow \sim W$.

3. W .

$\therefore A$.

						Premise 3	Premise 1	Premise 2
						Conclusion		
K	A	W	$\sim W$	$K \vee A$	$K \rightarrow \sim W$			
T	T	T	F	T	F			
T	T	F	T	T	T			
T	F	T	F	T	F			
T	F	F	T	T	T			
F	T	T	F	T	T			
F	T	F	T	F	T			Valid!
F	F	T	F	F	T			
F	F	F	T	F	T			

Part 2, Problem 2 Solution

1. $(W \& F) \& [(W \& F) \rightarrow \sim K]$.

$\therefore \sim K$.

Conclusion

Premise 1

W	F	K	W & F	$\sim K$	$(W \& F) \rightarrow \sim K$	$(W \& F) \& [(W \& F) \rightarrow \sim K]$
T	T	T	T	F	F	F
T	T	F	T	T	T	T
T	F	T	F	F	T	F
T	F	F	F	T	T	F
F	T	T	F	F	T	F
F	T	F	F	T	T	F
F	F	T	F	F	T	F
F	F	F	F	T	T	F

Valid!

Next Class...

You will learn an alternative way to assess the validity of arguments without using truth tables.

In the meantime, have a great Spring Break... but! Don't forget, there is a quiz on this the Sunday we resume classes. So do review this stuff.