

Discrete Math Problem Set: Arguments

Use a Truth Table to show that the following argument form is valid

$$\begin{array}{l} 1. p \vee q \\ \quad \neg p \\ \hline \therefore q \end{array}$$

p	q	$p \vee q$	$\neg p$	q
T	T	T	F	T
T	F	T	F	F
F	T	T	T	T
F	F	F	T	F

- Critical Row

- All premises & Conc "T"
- Modus Ponens
- Argument Form Valid

$$\begin{array}{l} 2. p \\ \hline \therefore p \vee q \end{array}$$

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

- Critical Row

- All premises & Conc T
- Modus Ponens = Valid

$$3. p \rightarrow q$$

$$\therefore \frac{q}{p}$$

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

Critical Rows
 - 1st Row: Premise & Conclusion "T"
 - 3rd Row: Premise "T" & Conclusion "F"
 Argument Form: Invalid

$$7. p \wedge q \rightarrow r$$

$$\therefore \frac{\neg r}{\neg p}$$

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

- Crit Row

- Crit Row

- Crit Row

4th Row: Premises "T" & Conclusion "F"

Argument Form: Invalid