

Determine if it is a T, F or Contingent Tue Oct 2 2018

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

Is a T

Proof: $(p \wedge q) \vee (p \wedge \neg q)$

2. $A \equiv p \wedge q$ (we define A)

3. $A \vee \neg A$ (By 1 & 2)

4. T (By law of excluded middle)

Determine if it is T, F, Cont., Valid/Invalid

$$1) p \rightarrow q \rightarrow \neg p$$

$$\text{Trd: } (p \rightarrow q) \rightarrow \neg p$$

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

2 possibilities

Therefore

Invalid Statement

Determine if it is $\top$, F , C , Invalid

$$p \rightarrow q \equiv \neg p \vee q$$

Conditional Elimination

$$1) (p \vee q) \rightarrow (p \wedge q)$$

$$2) \neg(p \vee q) \vee (p \wedge q) \quad (\text{De Morgan})$$

$$3) [\neg(p \vee q) \vee p] \wedge [\neg(p \vee q) \vee q] \quad (\text{Distributive law})$$

$$4) (\neg q \vee p) \wedge (\neg p \vee q)$$

$$5) (\neg q \wedge \neg p) \vee (p \wedge q)$$

(De Morgan
Dist. law
EXL middle)
(First LEM)

HOMEWORK

Discuss the validity of
following reasoning / deduction

$$\begin{array}{l} p \rightarrow q \\ p \rightarrow r \\ \hline \neg r \rightarrow q \end{array}$$

modus
tollens

$$\equiv [(p \rightarrow q) \wedge (p \rightarrow r)] \rightarrow [r \rightarrow q]$$