

Logic Tutorial 2 Solutions

1) a.

- i) False $A \text{ sees } B$ is false, and $B \text{ sees } C$ is true. $\text{False} \leftrightarrow \text{True}$ is False.
- ii) True $B \text{ next-to } D$ is True. $\text{True} \vee \text{anything}$ is True.
- iii) True $F \text{ above } A$ is False. $\text{anything} \wedge \text{False}$ is False, and $\neg(\text{False})$ is True.
- iv) True $A \text{ sees } E$ is False. So $\neg[A \text{ sees } E]$ is True, and $\text{anything} \rightarrow \text{True}$ is True.
- v) True Consider $\neg([B \text{ above } E] \leftrightarrow [B \text{ next-to } C])$. This is $\neg(\text{True} \leftrightarrow \text{False})$ which is $\neg(\text{False})$ which is True.

b. The following is an example:

A	B	D
F	C	
		E

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2.

a. Contingency

P	Q	$P \vee Q$	$P \wedge (P \vee Q)$
T	T	T	T
T	F	T	T
F	T	T	F
F	F	F	F

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b. Contingency

P	Q	$P \vee Q$	$P \rightarrow Q$	$(P \vee Q) \wedge (P \rightarrow Q)$
T	T	T	T	T
T	F	T	F	F
F	T	T	T	T
F	F	F	T	F

c. Inconsistency

P	Q	$\neg P$	$Q \rightarrow P$	$P \vee (Q \rightarrow P)$	$Q \wedge \neg P$	Given wff c.
T	T	F	T	T	F	F
T	F	F	T	T	F	F
F	T	T	F	F	T	F
F	F	T	T	T	F	F

d. Tautology

P	Q	$Q \vee P$	$P \wedge (Q \vee P)$	$P \wedge (Q \vee P) \leftrightarrow P$
T	T	T	T	T
T	F	T	T	T
F	T	T	F	T
F	F	F	F	T

e. Tautology

P	Q	$P \rightarrow Q$	$\neg P$	$\neg P \vee Q$	Given wff in e.
T	T	T	F	T	T
T	F	F	F	F	T
F	T	T	T	T	T
F	F	T	T	T	T

f. Tautology – I leave the details to you!

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