MATH 318, Assignment 3

Kyle Rubenok, 260667187

October 2019

1. (a)

p	q	(	¬	p	→	q	)
⊤	⊤		⊥	⊤	⊤	⊤	
⊤	⊥		⊥	⊤	⊤	⊥	
⊥	⊤		⊤	⊥	⊤	⊤	
⊥	⊥		⊤	⊥	⊥	⊥	

(b)

p	q	(	p	∧	q	)	∨	¬	p
⊤	⊤		⊤	⊤	⊤		⊤	⊥	⊤
⊤	⊥		⊤	⊥	⊥		⊥	⊥	⊤
⊥	⊤		⊥	⊥	⊤		⊤	⊤	⊥
⊥	⊥		⊥	⊥	⊥		⊤	⊤	⊥

(c)

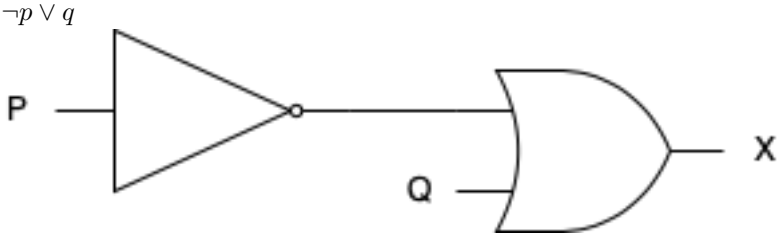
p	q	p	→	(	¬	p	→	q	)
⊤	⊤	⊤	⊤		⊥	⊤	⊤	⊤	
⊤	⊥	⊤	⊤		⊥	⊤	⊤	⊥	
⊥	⊤	⊥	⊤		⊤	⊥	⊤	⊤	
⊥	⊥	⊥	⊤		⊤	⊥	⊥	⊥	

(d)

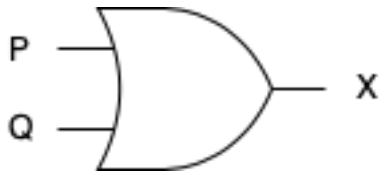
p	q	q	∨	(	p	→	(	q	∧	(	p	→	q	)))
⊤	⊤	⊤	⊤		⊤	⊤		⊤	⊤		⊤	⊤	⊤	
⊤	⊥	⊥	⊥		⊤	⊥		⊥	⊥		⊤	⊥	⊥	
⊥	⊤	⊤	⊤		⊥	⊤		⊤	⊤		⊥	⊤	⊤	
⊥	⊥	⊥	⊤		⊥	⊤		⊥	⊥		⊥	⊤	⊥	

C is the only tautology.

2. (a) $\neg p \vee q$



(b) $p \vee q$


P
Q
X