

Worksheet 1 — January 31

Note: you may want to use a separate sheet of paper for scratch work.

1. Fill in the following truth tables. Which of them are tautologies? Which are falsehoods?

(a)

p	q	$(p \cdot q) \vee (-p \vee -q)$
T	T	
T	⊥	
⊥	T	
⊥	⊥	

(b)

p	q	$-(p \supset q) \cdot (p \cdot q)$
T	T	
T	⊥	
⊥	T	
⊥	⊥	

(c)

p	q	$(p \cdot q) \vee (-p \cdot -q)$
T	T	
T	⊥	
⊥	T	
⊥	⊥	

(d)

p	q	r	$-(p \cdot q) \vee r$
T	T	T	
T	T	⊥	
T	⊥	T	
T	⊥	⊥	
⊥	T	T	
⊥	T	⊥	
⊥	⊥	T	
⊥	⊥	⊥	

(e)

p	q	r	$(p \vee q) \vee -(p \vee (q \cdot r))$
T	T	T	
T	T	⊥	
T	⊥	T	
T	⊥	⊥	
⊥	T	T	
⊥	T	⊥	
⊥	⊥	T	
⊥	⊥	⊥	

2. Match the schemas on the left side with their equivalent formulations on the right side.

(a) $-(p \cdot q)$

(b) $-(-p \cdot -q)$

(c) $-(p \vee q)$

(d) $p \cdot (q \vee r)$

(e) $p \vee (q \cdot r)$

(f) $p \supset (q \vee -q)$

(g) $p \supset (q \supset r)$

(h) $(p \supset q) \supset r$

(i) $(p \cdot q) \vee (p \cdot r)$

(ii) $q \supset (p \supset r)$

(iii) $-q \supset p$

(iv) $-p \vee -q$

(v) $-p \cdot -q$

(vi) $(p \vee q) \cdot (p \vee r)$

(vii) $-q \vee (p \vee r)$

(viii) $p \supset p$