Asynchronous Task 1.6:

1. Determine whether the following compound propositions are satisfiable.

    a. $(p \lor q) \land (\neg p \land \neg q)$

Let p, q = T

(T v T) ^ (F ^ F)

T ^ F

F or not satisfiable

    b. $(\neg p \lor q) \land (p \lor r) \land (\neg r \land \neg q)$

Let p, q, r = T

(F v T) ^ (T v T) ^ (F ^ F)

T ^ T ^ F

T ^ F

F or not satisfiable

    c. $(\neg p \lor r) \lor (q \lor r) \lor (\neg p \land \neg q)$

Let p, q, r = T

(F v T) v (T v T) v (F ^ F)

T v T v F

T v F

T or satisfiable

2. Determine whether the following compound propositions are satisfiable.

$$(p \lor \neg q) \land (q \lor \neg r) \land (r \lor \neg p)$$

p	q	r
T	T	F
T	F	T
F	T	F
F	F	T

Is (p ∨ ¬ q) ∧ (q ∨ ¬ r) ∧ (r ∨ ¬ p) satisfiable?

(T v F) ^ (F v T) ^ (F v F)

T ^ T ^ F

Satisfiable

Is (p ∨ ¬ q) ∧ (q ∨ ¬ r) ∧ (r ∨ ¬ p) unsatisfiable?

(T v F) ^ (F v T) ^ (F v F)

T ^ T ^ F

Not Unsatisfiable

Is (p ∨ ¬ q) ∧ (q ∨ ¬ r) ∧ (r ∨ ¬ p) valid?

(T v F) ^ (F v T) ^ (F v F)

T ^ T ^ F

Not Valid

Is (p ∨ ¬ q) ∧ (q ∨ ¬ r) ∧ (r ∨ ¬ p) falsifiable?

(T v F) ^ (F v T) ^ (F v F)

T ^ T ^ F

Falsifiable