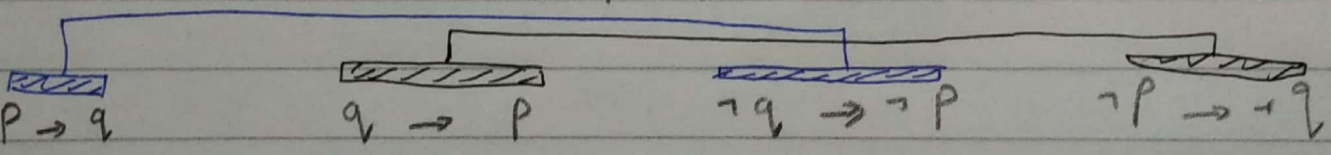
Subject:

P Proposition (statment): sentence that either True ∨ False

- Not ¬
- or ∨
- And ∧
- Xor ⊕
- Implication — antecedent [P] ⟶ [q] → Consequent
  - if P Then q
  - P is sufficient for q
  - a neccary Condition for P is q
  - q is neccary for P
  - q when even P
  - q if P
  - a sufficient Condition for P is q
  - P only if q
  - P implies q
  - if P,q
  - q follows From P
  - q where P
  - q unless ¬P

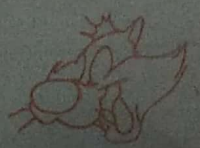


Converse — Contrapositive — Inverse

- BiConditional $P \leftrightarrow q \equiv (P \rightarrow q) \wedge (q \rightarrow P)$
  - if P necessary and sufficient for q
  - if P Then q, and Converse
  - P if and only if q [P iff q]

P	q	P ↔ q
T	T	T
T	F	F
F	T	F
F	F	T

- Tautologies: always True
- Contradiction: always False
- Falsifiable: NOT Tautologies
- satsifiable: NOT Contradiction
- Contingency: Satsifiable & Falsifiable



FIRST

Sheet 1

1)

a) PROP c) PROP e) NOT PROP

b) PROP d) PROP f) NOT PROP

12)

a) if p then q b) ¬q iff r

c) q unless p d) p or q or r

e) (p unless r) or (q unless r) f) p and q or ¬q and r

15)

a) r ∧ ¬p b) (¬p ∧ q) ∧ r

c) r → (q ↔ ¬p) d) ¬q ∧ (¬p ∧ r)

e) q → (¬r ∧ ¬p) f) (p ∧ r) → ¬q

16)

a) T b) F c) T d) F

18)

a) T b) T c) F d) F

24)

p → q q → p ¬p → ¬q ¬q → ¬p

Converse Inverse Contrapositive

a) if I will stay at home then it's snows tonight (Converse)

if I won't stay at home then it's won't snow tonight (Contrapositive)

if it won't snow tonight then I won't stay at home (Inverse)

b) ✓

c) ✓

29)

a) $2^1 = 1$ b) $2^4 = 16$ c) 2^6 d) 2^4

30)

a) Contradiction b) Tautology

c)

p	q	$p \oplus \neg q$
1	1	1
1	0	0
0	1	0
0	0	1

d)

p	q	$\neg p \oplus \neg q$
1	1	0
1	0	1
0	1	1
0	0	0

e) Tautology f) Contradiction

31)

p	q	$p \to q$	$\neg p \to q$	$p \to \neg q$	$p \leftrightarrow q$	$\neg p \leftrightarrow \neg q$
1	1	1	1	0	1	1
1	0	0	1	1	0	0
0	1	1	1	1	0	0
0	0	1	0	1	1	1

a) 0 b) 0 c) 1 d) 1 e) 1 f) 1

1	1	1	0	1	1
1	1	1	1	1	1
1	0	1	0	1	1

62) $\underbrace{(K \vee H)}_{3} \wedge \underbrace{(R \oplus V)}_{2} \wedge \underbrace{(A \to R)}_{3} \wedge \underbrace{(V \leftrightarrow K)}_{2} \wedge \underbrace{(H \to (A \wedge K))}_{3}$

↓ here

option

Start from here because it's least option

R : 0 , V : 1 , A : 0 , H : F , K : 1

∴ V & K Cheating