Homework 2

**Page 35**

10(b).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| p | q | r | p → q | q → r | (p → q)∧(q → r) | p → r | [(p → q)∧(q → r)]→(p → r) |
| T | T | T | T | T | T | T | T |
| T | T | F | T | F | F | F | T |
| T | F | T | F | T | F | T | T |
| T | F | F | F | T | F | F | T |
| F | T | T | T | T | T | T | T |
| F | T | F | T | F | F | T | T |
| F | F | T | T | T | T | T | T |
| F | F | F | T | T | T | T | T |

22.

(p → q) ∧ (p → r)

≡ (¬ p ∨ q) ∧ (¬ p ∨ r) Implication

≡ ¬ p ∨ (q ∧ r) Distributive Law

≡ p → (q ∧ r) Implication

34(c).

(¬p ∨ q) ∧ (¬q ∨ T)

**Page 53**

2.

a) True

b) False

c) False

d) True

16.

a) True

b) False

c) True

d) False

**Does (p → q) → (r → s) logically imply (p → r) → (q → s)?**

The above statement is false when (p → q) → (r → s) is true and (p → r) → (q → s) is false.

If (p → r) → (q → s) is false, then (q → s) is false and (p → r) is true. Hence q is true and s is false.

If (p → q) → (r → s) is true, and q is true and s is false, then p and r can be false.

|  |  |  |  |
| --- | --- | --- | --- |
| p | q | r | s |
| F | T | F | F |

This gives the counterexample: