**Problem 1: Truth Tables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| True | True | True | True | False | True |
| True | True | False | True | True | True |
| True | False | True | False | False | False |
| True | False | False | False | True | True |
| False | True | True | False | False | False |
| False | True | False | False | True | True |
| False | False | True | False | False | False |
| False | False | False | False | True | True |

1.)

2.)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
| T | T | T | T | F | F | F |
| T | T | T | F | F | T | F |
| T | T | F | T | F | T | F |
| T | T | F | F | F | F | F |
| T | F | T | T | F | F | F |
| T | F | T | F | F | T | F |
| T | F | F | T | F | T | F |
| T | F | F | F | F | F | F |
| F | T | T | T | F | F | F |
| F | T | T | F | F | T | F |
| F | T | F | T | F | T | F |
| F | T | F | F | F | F | F |
| F | F | T | T | T | F | F |
| F | F | T | F | T | T | T |
| F | F | F | T | T | T | T |
| F | F | F | F | T | F | F |

3.)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
| T | T | T | T | F | F | T |
| T | T | T | F | F | F | T |
| T | T | F | T | F | F | T |
| T | T | F | F | F | F | T |
| T | F | T | T | T | T | T |
| T | F | T | F | T | T | F |
| T | F | F | T | T | F | T |
| T | F | F | F | T | F | T |
| F | T | T | T | T | T | T |
| F | T | T | F | T | T | F |
| F | T | F | T | T | F | T |
| F | T | F | F | T | F | T |
| F | F | T | T | F | F | T |
| F | F | T | F | F | F | T |
| F | F | F | T | F | F | T |
| F | F | F | F | F | F | T |

**Problem 2: Boolean Algebraic Laws**

1.)

Implication

Implication

Distributivity

Implication

2.)

De Morgan’s

De Morgan’s

Double Negation/Complement

Distributivity

Commutativity

Distributivity

Distributivity

Negation\Inverse

Negation\Inverse

Implication

Implication

Identity

Identity

**Problem 3: Disproof**

**Problem 4: Inference – Verbal**

Premise 1.)

Premise 2.)

Premise 3.)

Conclude

Premise 3

Premise 3 + Premise 2

Modus Tollens

Premise 1 +

Domination

De Morgan’s

Contradiction

Conjunctive Simplification

**Problem 5: Inference – Symbolic**

Premise 1.)

Premise 2.)

Premise 3.)

Premise 4.)

Conclude that

Premise 4

Premise 1+ Premise 4

Commutativity

Disjunctive Syllogism

Implication

De Morgan’s

Associativity

Implication

Premise 3

Syllogism

Premise 2

Implication

Distributivity

Implication

Implication

Conjunctive Simplification

Syllogism

Commutativity

Identity

Syllogism