1.

a. A+A\*B =

A -- Absorption Law

b. (A\*B)+(A\*B’) =

A\*(B+B’) = -- Distributive Law

A \* tautology = --Negation Law

A -- Identity Law

c. (BC’+A’D)(AB’+CD’)

False -- contradiction

2.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A1 | A2 | B1 | B2 | Quotient1 | Quotient2 | Remainder1 | Remainder2 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |

Quotient1: A1‘A2‘B1‘B2' + A1‘A2B1‘B2' + A1A2‘B1‘B2' + A1A2‘B1‘B2+ A1A2B1‘B2' + A1A2B1‘B2

Simplified Quotient 1: (A1 + ~B2) \* ~B1

Quotient2:

(~A1 \* ~A2\*~B1\*~B2) + (~A1\*A2+~B1+~B2) + (~A1\*A2\*~B1\*B2) + (A1\*~A2\*~B1\*~B2) + (A1\*~A2\*B1\*~B2) + (A1\*A2\*~B1\*~B2) + (A1\*A2\*~B1\*B2) + (A1\*A2\*B1\*~B2) + (A1\*A2\*B1\*B2)

Simplified Quotient 2: (A1 \* A2) +( A1 \* ~B2) +( A2 \* ~B1) + (~B1 \* ~B2)

Remainder 1: (~A1 \* ~A2\*~B1\*~B2) + (~A1\*A2\*~B1\*~B2) + (A1\*~A2\*~B1\*~B2) + (A1\*~A2\*B1\*B2) + (A1\*A2\*~B1\*~B2)

Simplified Remainder 1: (A1 + ~B2) \* (B1+~B2) \* (~B1 + B2) \* (~A2 + ~B2)

Remainder 2: (A2 + ~B1) \* (B1 + ~B2) \* (~A1 + ~B2)

3.

1. 312 = 100111000
2. 01011010011101 = 5789
3. 11001101001111 = -3249
4. -68 = 10111100
5. 21 + 17 = 00010101 + 00010001 = 00100110 = 38
6. 43 - 24 = 00101011 + 11101000 = 00010011 = 19