

① $F(A, B, C) = \sum_m(0, 1, 2, 4, 5)$

A	B	C	F
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

$$F = \bar{B} + \bar{A}\bar{C}$$

② $F(A, B, C) = \sum_m(0, 1, 2, 3, 5, 7)$

A	B	C	F
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

$$F = \bar{A} + C$$

③ $F(A, B, C, D) = \sum_m(0, 1, 9, 11, 13, 15)$

A	B	C	D	F
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0

$$F = AD + \bar{A}BC$$

④ $F(A, B, C, D) = \sum_m(0, 2, 4, 8, 10, 11, 13, 15)$

A	B	C	D	F
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0

$$F = \bar{B}\bar{C} + \bar{A}D$$

A	B	C	D	F
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0

$$F = D\bar{C} + DA + ABC\bar{D}$$

$$\textcircled{6} \quad F(ABCD) = \bar{A}D + B\bar{D} + \bar{B}C + A\bar{B}\bar{D}$$

A	B	C	D	00	01	11	10
01							
11							
10							

$$F = D + \bar{B}C$$

$$\textcircled{7} \quad F(W, X, Y, Z) = WX + Y\bar{Z} + WY\bar{Z}$$

CD	00	01	11	10
AB	1			1
W	1	1	0	1
X	1	0	1	0
Y	0	1	1	1
Z	1	1	0	0

$$F = W\bar{X} + Z\bar{W} + \bar{Z}\bar{Y}$$

CD	00	01	11	10
AB	00			
W	01			
X	1	1	1	1
Y	1	1	1	1
Z	1	1	1	1

$$F = AC + AD + A\bar{B}\bar{C} + BCD$$

CD	00	01	11	10
AB	00			
W	01			
X	1	1	1	1
Y	1	1	1	1
Z	1	1	1	1

$$F = \bar{A}\bar{B}\bar{E}\bar{B} + \bar{A}\bar{B}\bar{C}D + A\bar{B}CD \\ - A\bar{B}C\bar{D}$$

CD	00	01	11	10
AB	00			
W	01			
X	1	1	1	1
Y	1	1	1	1
Z	1	1	1	1

$$F = AB + AC$$

CD	0	1
AB	00	1
W	01	1
X	1	1
Y	1	1
Z	1	1

$$F = \bar{A}\bar{B}\bar{E} + AB\bar{E} \\ - ABC + A\bar{B}C$$

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

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

A

B

C

D

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

ABCD

ABC + AC̄D̄

ACD + ĀD̄

BD

AB̄C + BC̄D

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

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

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

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

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

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

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

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

1. $A + B + C + D = A + B + C + D$

2. $A + B + C + D = A + B + C + D$

3. $C + D + C + D = C + D + C + D$

4. $D + D + D + D = D + D + D + D$