

$$f_1(a, b, c) = \sum m(0, 2, 3, 4, 6, 7)$$

$$\text{SOP} \Rightarrow bc'$$

$$\text{POS} \Rightarrow b+c'$$

ab \ c	00	01	11	10
0	1	1	1	1
1	0	1	1	0

$$f_2(a, b, c, d) = \prod M(0, 2, 5, 7, 8, 10)$$

$$\text{POS} \Rightarrow (b+d)(a+b'+d')$$

$$\text{SOP} \Rightarrow b'd + bd' + ad$$

cd \ ab	00	01	11	10
00	0	1	1	0
01	1	0	1	1
11	1	0	1	1
10	0	1	1	0

$$f_3(a, b, c, d) = \sum m(0, 3, 4, 5, 6, 7, 11, 12, 13, 14, 15) + d(2, 8, 9)$$

$$\text{POS} \Rightarrow (b+c+d')(b+c'd)$$

$$\text{SOP} \Rightarrow c'd' + b + d$$

cd \ ab	00	01	11	10
00	1	1	1	X
01	0	1	1	X
11	1	1	1	1
10	X	1	1	0

$$f_4(a, b, c, d) = \sum m(0, 4, 5, 6, 7, 11, 12, 13, 14, 15) + d(2, 3)$$

$$\text{SOP} \Rightarrow b + (d + a'd')$$

$$\text{POS} \Rightarrow (b+c+d')(d+b+a')$$

cd \ ab	00	01	11	10
00	1	1	1	0
01	0	1	1	0
11	X	1	1	1
10	X	1	1	0

$$f_5(a,b,c,d) = \prod M(1,2,3,5,6) \cdot D(4)$$

$$\text{SOP} \Rightarrow a + c'd + bcd$$

$$\text{POS} \Rightarrow (d + a' + c)(a + b + d')(a + b + c)$$

ab \ cd	00	01	11	10
00	1	X	1	1
01	1	0	1	1
11	1	1	1	1
10	1	0	1	1

$$f_1(a,b,c) = ac + bd + abd'$$

ab \ c	00	01	11	10
00	0	0	0	1
01	0	1	1	0
11	0	1	1	1
10	0	0	1	1

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$$f_2(a,b,c,d) = abd' + ab + a'b'c'$$

	00	01	11	10
00	0	1	1	1
01	0	1	1	0
11	0	0	1	0
10	0	0	1	1

	00	01	11	10
00	0	0	0	1
01	0	1	1	0
11	0	1	1	1
10	0	0	1	1

$$f_3(a,b,c,d) = bd + abd' + acd$$

$$f_4(a,b,c,d) = ac + ah'(c'd + a'bd + bcd)$$

	00	01	11	10
00	0	0	0	1
01	0	1	1	0
11	0	1	1	1
10	0	0	1	1

$$f_5(a,b,c,d) = (b + d')(a + b)(a + c)$$

	00	01	11	10
00	1	1	1	1
01	0	1	1	0
11	0	0	1	0
10	0	0	1	1

$$f_2 = f_5 / f_1 = f_3 = f_4$$

1) $f(a, b, c) = a + a'c + ab + a'b'c$

Q1 - 3
(c)

ab	00	01	11	10
c=0	1	0	1	0
c=1	0	0	1	0

ab	00	01	11	10
c=0	0	1	1	1
c=1	1	1	1	1

$\Rightarrow f = a'b'c' \rightarrow \text{SOP}$

$f = a + b + c \rightarrow \text{POS}$

2) $f(a, b, c, d) = c(d' + ab'd) + c'd + a'b$

$f = d' + a'b \rightarrow \text{SOP}$

$f = (a' + d')(b + d') \rightarrow \text{POS}$

ab	00	01	11	10
c=0	1	1	1	1
c=1	0			1
c=1	0			1
c=1	1	1	1	1

3) $f(a, b, c, d) = a'd + ab'd' + bd + a'd'$

ab	00	01	11	10
c=0	0	0	1	0
c=1	0	0	0	1
c=1	0	0	0	1
c=1	0	0	1	0

ab	00	01	11	10
c=0	1	1	1	1
c=1	1	1	1	0
c=1	1	1	1	0
c=1	1	1	0	1

$ad' + abd' \rightarrow \text{SOP}$

$(a)(a' + b + d)(b' + d') \rightarrow \text{POS}$

A) $f_1(a,b,c) = A'B + BC + AC + AB'$

B) $f_2(a,b,c) = (A+B)(B+C)$

C) $f_3(a,b,c,d) = (A'+C)(A+C+D')(A+B+D')(B+C+D')$

$\Sigma m(2,3,4,5,7), \Pi M(0,1,6)$

ab	00	01	11	10
0	0	1	0	1
1	0	1	1	1

(A)

$f_2(a,b,c) = \Sigma m(3,4,5,7)$

$\Pi M(0,1,2,6)$

ab	00	01	11	10
0	0	0	0	1
1	0	1	1	1

(B)

$f_3(a,b,c,d) = \Sigma m(0,2,6,7,8,9,10,14,15)$

$\Pi M(1,3,4,5,11,12,13)$

	00	01	11	10
00	1	0	0	1
01	1	0	0	1
11	0	1	1	0
10	1	1	1	1

(C)

abc	00	01	11	10
00	1	1	1	1
01	1	1	1	1
11	0	0	0	0
10	1	0	0	1

abc	00	01	11	10
00	1	1	1	1
01	1	1	0	0
11	0	0	0	0
10	1	0	0	1

$f = [(B+E')A][C'E+D'] = 1$

$A = (A'+B'E')(D+E)(D+C) = 1$

$f = \Sigma m(0,1,2,4,5,6,8,9,10,12,13,14,16,18,24,26)$

0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
2	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
4	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
6	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
8	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
10	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
12	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
14	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
16	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
18	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
20	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
22	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
24	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
26	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
28	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0