

5.5

(a)

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

$$f = a'cd' + a'cd + a'bc + ab'c'd' + abcd'$$

(c)

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

$$f = ad' + b'c'd' + bc'd + a'bc + ab'c$$

5.6

(a)

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

$$f = a'bc' + ac'd + b'cd'$$

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

$$f = (a+b+c)(a'+c+d)(c'+d')(b'+c')$$

(b)

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

$$f = a'b'd + bc'd' + cd$$

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

$$f = (b+d)(a'+c)(b'+d')(c'+d)$$

5.10

$$F = AB'D' + A'B + AC + CD$$

(a)  $F = \Pi M(0, 1, 9, 12, 13, 14)$

(b)  $F' = A'B'C' + ABD' + ACD$

(c)  $F = (A+B+C)(A'+B'+D)(A'+C+D')$

AB \ CD	00	01	11	10
00	0	1	0	1
01	0	1	0	0
11	1	1	1	1
10	1	1	0	1

5.12

(a)  $f_1 = \sum m(1, 2, 5, 7)$

(d)  $f_4 = \sum m(0, 2, 3, 7)$

BC \ A	0	1
00		
01	1	1
11		1
10	1	

$$f_1 = B'C + AC + A'BC'$$

bc \ a	0	1
00	1	
01	0	
11	1	1
10	1	

$$f_4 = bc + a'c'$$

5.20

			AC'	AB'
AB \ CD	00	01	11	10
00			1	X
01		X	1	X
11	1	X		1
10		X	1	X

$\xleftarrow{ACD}$  (row 01)  
 $\xleftarrow{BCD}$  (row 11)  
 $\xleftarrow{BCD}$  (row 10)  
 $\xleftarrow{ACD'}$  (row 00)

PI:  $AC', AB', A'CD, B'CD, BCD', ACD'$

$$f = AC' + AB' + \begin{cases} A'CD \\ B'CD \end{cases} + \begin{cases} BCD' \\ ACD' \end{cases}$$

AB \ CD	00	01	11	10
00		1	X	
01		X	X	
11	1	X	1	1
10		X	X	

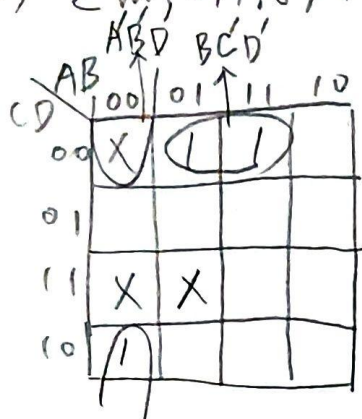
$\xleftarrow{B}$  (column 01)  
 $\xleftarrow{CD}$  (row 11)

PI:  $B, CD$

$$f = B + CD$$

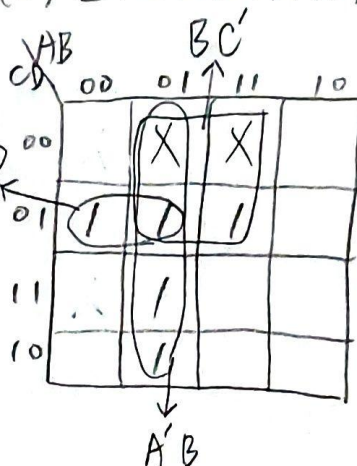
5.22

(b)  $\Sigma_m(2,4,8) + \Sigma_d(0,3,7)$



$A'B'D + BCD'$

(c)  $\Sigma_m(1,5,6,7,13) + \Sigma_d(4,8)$

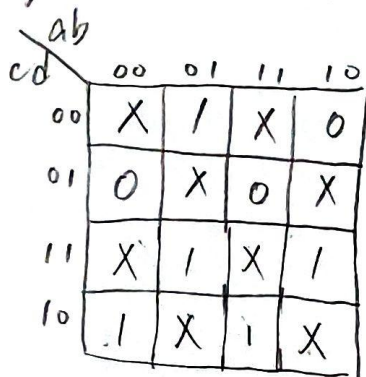


$A'CD + BC' + A'B$

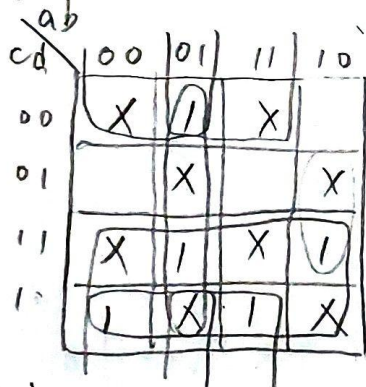
5.31

a	b	c	d	f
0	0	0	0	X
0	0	0	1	0
0	0	1	0	1
0	0	1	1	X
0	1	0	0	1
0	1	0	1	X
0	1	1	0	X
0	1	1	1	1
1	0	0	0	0
1	0	0	1	X
1	0	1	0	X
1	0	1	1	1
1	1	0	0	X
1	1	0	1	0
1	1	1	0	1
1	1	1	1	X

(a)



(b)

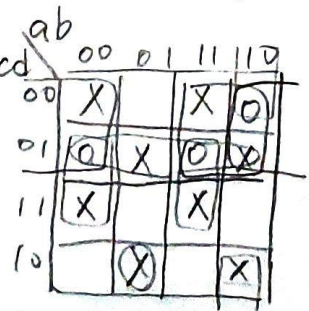


for PI:  $C, BD', A'B, A'D', AB'D$

(c)

$f = \begin{cases} C + BD' \\ C + A'B \\ C + A'D' \end{cases}$

(d)



$a'bcd', a'b'd, abd$   
 $ab'd', b'c', ac', c'd$

(e)

$f = (b+c)(a'+c)$   
 $= (c+d')(a'+c)$   
 $= (c+d')(b+c)$