1) $f(x,y,z) = \sum m(1,3,7)$

	x	y	z	s
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	1
4	1	0	0	0
5	1	0	1	0
6	1	1	0	0
7	1	1	1	1

$\bar{x}\bar{y}z + \bar{x}yz + xyz$

xy \ z	0	1
00		1
01		1
11		1
10		

$\bar{x}z + yz$

b $f(x,y,z) = \sum m(0,4,6)$

	x	y	z	s
0	0	0	0	1
1	0	0	1	0
2	0	1	0	0
3	0	1	1	0
4	1	0	0	1
5	1	0	1	0
6	1	1	0	1
7	1	1	1	0

$\bar{x}\bar{y}\bar{z} + x\bar{y}\bar{z} + xy\bar{z}$

xy \ z	0	1
00	1	
01		
11	1	
10	1	

$x\bar{z} + \bar{y}\bar{z}$

c) $f(x,y,z) = \sum_{}(0,1,3,5)$

	x	y	z	S
0	0	0	0	1
1	0	0	1	1
2	0	1	0	0
3	0	1	1	1
4	1	0	0	0
5	1	0	1	1
6	1	1	0	0
7	1	1	1	0

$\bar{x}\bar{y}z + \bar{x}\bar{y}z + \bar{x}yz + x\bar{y}z$

xy \ z	0	1
0 0	1	1
0 1		1
1 1		
1 0		1

$\bar{x}\bar{y} + \bar{x}z + \bar{y}z$

d) $f(x,y,z) = \sum_{}(2,3,6,7)$

	x	y	z	S
0	0	0	0	0
1	0	0	1	0
2	0	1	0	1
3	0	1	1	1
4	1	0	0	0
5	1	0	1	0
6	1	1	0	1
7	1	1	1	1

$\bar{x}y\bar{z} + \bar{x}yz + xy\bar{z} + xyz$

xy \ z	0	1
0 0		
0 1	1	1
1 1	1	1
1 0		

$S = y$

e) $f(x,y,z) = \sum m(0,3,4,5)$

	x	y	z	s
0	0	0	0	1
1	0	0	1	0
2	0	1	0	0
3	0	1	1	1
4	1	0	0	1
5	1	0	1	1
6	1	1	0	0
7	1	1	1	0

$\bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}\bar{z} + x\bar{y}z$

xy \ z	0	1
00	1	
01		1
11		
10	1	1

$\bar{y}\bar{z} + x\bar{y} + \bar{x}yz$

2)

$F(x,y,z) = \prod M(1,3,7)$

	x	y	z	s
0	0	0	0	1
1	0	0	1	0
2	0	1	0	1
3	0	1	1	0
4	1	0	0	1
5	1	0	1	1
6	1	1	0	1
7	1	1	1	0

$(x+y+\bar{z}) \cdot (x+\bar{y}+\bar{z}) \cdot (\bar{x}+\bar{y}+\bar{z})$

xy \ z	0	1
00	0	
01	0	
11	0	
10		

$(x+\bar{z}) \cdot (\bar{y}+\bar{z})$

b) $F(x,y,z) = \Pi M(3,5,7)$

	x	y	z	S
0	0	0	0	1
1	0	0	1	1
2	0	1	0	1
3	0	1	1	0
4	1	0	0	1
5	1	0	1	0
6	1	1	0	1
7	1	1	1	0

$(x+\bar{y}+\bar{z}) \cdot (\bar{x}+y+\bar{z}) \cdot (\bar{x}+\bar{y}+\bar{z})$

xy \ z	0	1
00	0	
01	0	
11	0	
10	0	

$(\bar{y}+\bar{z}) \cdot (\bar{x}+\bar{z})$

c) $F(x,y,z) = \Pi M(1,2,3,5)$

	x	y	z	S
0	0	0	0	1
1	0	0	1	0
2	0	1	0	0
3	0	1	1	0
4	1	0	0	1
5	1	0	1	0
6	1	1	0	1
7	1	1	1	1

$(x+y+\bar{z}) \cdot (x+\bar{y}+z) \cdot (x+\bar{y}+\bar{z}) \cdot (\bar{x}+y+\bar{z})$

xy \ z	0	1
00	0	
01	0	0
11		
10	0	0

$(x+\bar{y}) \cdot (x+\bar{z}) \cdot (\bar{y}+\bar{z})$

d) $F(x,y,z) = \prod M(0,2,3,7)$

	x	y	z	S
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	0
4	1	0	0	1
5	1	0	1	1
6	1	1	0	1
7	1	1	1	0

$(x+y+z)\cdot(x+\bar{y}+z)\cdot(x+\bar{y}+\bar{z})\cdot(\bar{x}+\bar{y}+\bar{z})$

xy \ z	0	1
00	0	
01	0	0
11		0
10		

$(x+z)\cdot(\bar{y}+\bar{z})$

e) $F(x,y,z) = \prod M(2,3,5,7)$

	x	y	z	S
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	0
4	1	0	0	1
5	1	0	1	0
6	1	1	0	1
7	1	1	1	0

$(x+\bar{y}+z)\cdot(x+\bar{y}+\bar{z})\cdot(\bar{x}+y+\bar{z})\cdot(\bar{x}+\bar{y}+\bar{z})$

xy \ z	0	1
00		
01	0	0
11	0	0
10	0	

$(x+\bar{y})\cdot(\bar{x}+\bar{z})$

3)

a) $f(x, y, w, z) = \sum m(1, 2, 3, 7, 13, 15)$

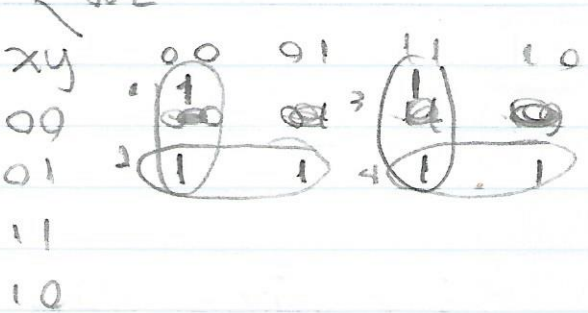
	x	y	w	z	S
0	0	0	0	0	0
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	1
8	1	0	0	0	0
9	1	0	0	1	0
10	1	0	1	0	0
11	1	0	1	1	0
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	0
15	1	1	1	1	1

xy \ wz	00	01	11	10
00		1	1	1
01			1	
11		1	1	
10				

$\bar{x}\bar{y}z + \bar{x}wz + ywz + xyz + x\bar{y}\bar{z}$

b) $f(x,y,w,z) = \sum_{w}(0,4,3,5,6,7)$

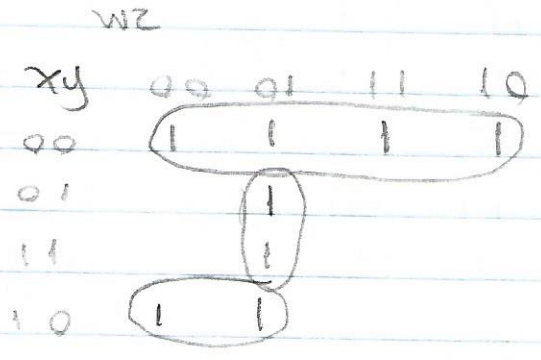
	x	y	w	z	S
0	0	0	0	0	1
1	0	0	0	1	0
2	0	0	1	0	0
3	0	0	1	1	1
4	0	1	0	0	1
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	1
8	1	0	0	0	0
9	1	0	0	1	0
10	1	0	1	0	0
11	1	0	1	1	0
12	1	1	0	0	0
13	1	1	0	1	0
14	1	1	1	0	0
15	1	1	1	1	0



$\bar{x}\bar{w}\bar{z} + \bar{x}y\bar{w} + \bar{x}wz + \bar{x}yw$

c) $f(x,y,w,z) = \sum m(0,1,2,3,5,8,9,13)$

	x	y	w	z	s
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	1
6	0	1	1	0	0
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	1
10	1	0	1	0	0
11	1	0	1	1	0
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	0
15	1	1	1	1	0



$\bar{x}\bar{y} + y\bar{w}z + x\bar{y}\bar{w}$

~~$\bar{x}\bar{y} + \bar{y}\bar{x}\bar{y}$~~

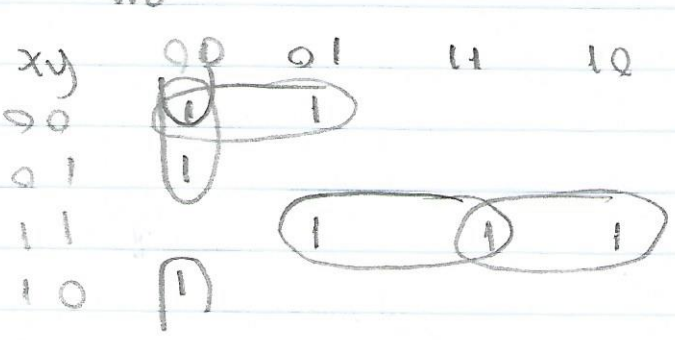
d) $f(x,y,w,z) = \sum m(2,4,6,10,12,14)$

xy \ wz	00	01	11	10
00				1
01	1			1
11	1			1
10				1

	x	y	w	z	S	
0	0	0	0	0	0	$w\bar{z} + y\bar{w}\bar{z}$
1	0	0	0	1	0	
2	0	0	1	0	1	-
3	0	0	1	1	0	
4	0	1	0	0	1	-
5	0	1	0	1	0	
6	0	1	1	0	1	-
7	0	1	1	1	0	
8	1	0	0	0	0	
9	1	0	0	1	0	
10	1	0	1	0	1	-
11	1	0	1	1	0	
12	1	1	0	0	1	-
13	1	1	0	1	0	
14	1	1	1	0	1	
15	1	1	1	1	0	

e) $f(x,y,w,z) = \sum m(0,1,4,8,13,14,15)$

	x	y	w	z	S
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	0
3	0	0	1	1	0
4	0	1	0	0	1
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	0
10	1	0	1	0	0
11	1	0	1	1	0
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	1
15	1	1	1	1	1



$\bar{x}\bar{w}\bar{z} + \bar{y}\bar{w}\bar{z} + \bar{x}\bar{y}\bar{w} + xyz + xyw$

4) $F(x,y,w,z) = \prod M(2,6,8,13)$

	x	y	w	z	S
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	0
3	0	0	1	1	1
4	0	1	0	0	1
5	0	1	0	1	1
6	0	1	1	0	0
7	0	1	1	1	1
8	1	0	0	0	0
9	1	0	0	1	1
10	1	0	1	0	1
11	1	0	1	1	1
12	1	1	0	0	1
13	1	1	0	1	0
14	1	1	1	0	1
15	1	1	1	1	1

xy \ wz	00	01	11	10
00				0
01		0		
11		0		
10	0			

$(\bar{y} + w + \bar{z}) \cdot (y + w + z) \cdot (x + y + \bar{z})$

b) $f(x, y, w, z) = \prod M(4, 9, 11, 12)$

	x	y	w	z	s
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	1
8	1	0	0	0	1
9	1	0	0	1	0
10	1	0	1	0	1
11	1	0	1	1	0
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	1
15	1	1	1	1	1

xy \ wz	00	01	11	10
00				
01	0			
11	0			
10			0	0

$$(\bar{y} + w + z) \cdot (\bar{x} + y + z)$$

c) $f(x,y,w,z) = \Pi M(8,9,11,13,15)$

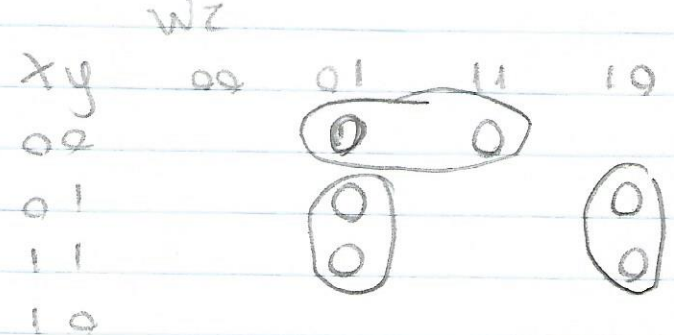
	x	y	w	z	S
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	1
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	1
8	1	0	0	0	0
9	1	0	0	1	0
10	1	0	1	0	1
11	1	0	1	1	0
12	1	1	0	0	1
13	1	1	0	1	0
14	1	1	1	0	1
15	1	1	1	1	0

xy \ wz	00	01	11	10
00				
01				
11		0	0	
10	0	0	0	

$(\bar{x}+\bar{z}) \cdot$ ~~[illegible]~~ $z\,(\bar{x}+y+z)$

d) $f(x,y,w,z) = \prod M(1,3,5,6,13,14)$

	x	y	w	z	s
0	0	0	0	0	1
1	0	0	0	1	0
2	0	0	1	0	1
3	0	0	1	1	0
4	0	1	0	0	1
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	1
8	1	0	0	0	1
9	1	0	0	1	1
10	1	0	1	0	1
11	1	0	1	1	1
12	1	0	0	0	1
13	1	1	0	1	0
14	1	1	1	0	0
15	1	1	1	1	1



$$(x+y+\bar{z}) \cdot (\bar{y}+w+\bar{z}) \cdot (\bar{y}+\bar{w}+z)$$

c) $f(x, y, w, z) = \Pi M(4, 6, 7, 8, 10, 12)$

	x	y	w	z	S
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	1
6	0	1	1	0	0
7	0	1	1	1	0
8	1	0	0	0	0
9	1	0	0	1	1
10	1	0	1	0	0
11	1	0	1	1	1
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	1
15	1	1	1	1	1

xy \ wz	00	01	11	10
00				
01	1		1	1
11				1
10	1			1

$$(x + \bar{y} + z) \cdot (\bar{x} + y + z) \cdot (x + \bar{y} + \bar{w}) \cdot (\bar{x} + \bar{w} + z)$$

4)

a) $\overline{(\bar{x}+\bar{y})} \cdot \overline{(x \cdot y)} + \overline{(yz+\bar{x})}$

	x	y	z	s
0	0	0	0	0
1	0	0	1	0
2	0	1	0	0
3	0	1	1	0
4	1	0	0	1
5	1	0	1	1
6	1	1	0	1
7	1	1	1	0

z 0 1

xy
00
01
11 1
10 1 1

$(x \cdot \bar{z}) + (x\bar{y})$

5)

	x	y	w	z	S
0	0	0	0	0	0
1	0	0	0	1	0
2	0	0	1	0	0
3	0	0	1	1	0
4	0	1	0	0	0
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	1
10	1	0	1	0	1
11	1	0	1	1	1
12	1	1	0	0	1
13	1	1	0	1	1
14	1	1	1	0	1
15	1	1	1	1	0

- $(x + w) \cdot (x + \bar{w})$