Dan Ports

6.111 PS1

1. 1. a
2. 0
3. 1
4. a
5. a
6. $a + b\bar{b}$
7. ab
8. b
9. $\bar{a} + \bar{a}b + \bar{b}\bar{a} + b\bar{b} = \bar{a}$
10. a
11. $a + b$
12. $a + b + \bar{a}\bar{b} = 1$
13. $a + b + \overline{(ab)} = a + b + \bar{a} + \bar{b} = 1$
14. y
15. x
16. $\bar{x}$
17. y
18. x
19. w
20. x
21. x
22. 0
23. w
24. $\bar{w}$
25. $xz + \bar{x}y$

26. $(x+z)(\bar{x}+y)$
27. $\bar{x} + \bar{y} + \bar{z}$

2. 1.

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

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

MSP: $\bar{a} + bc$

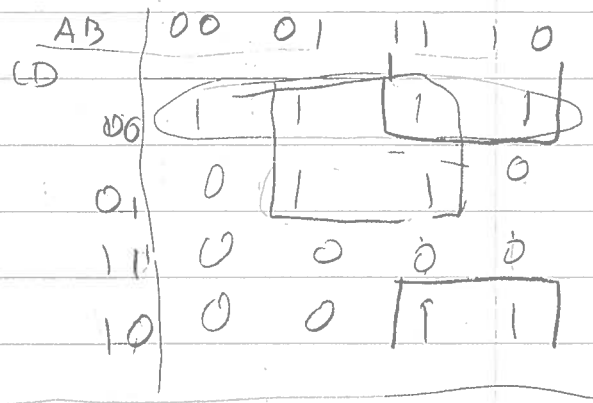
CD \ AB	00	01	11	10
00	1	1	0	0
01	1	1	0	0
11	1	1	1	0
10	1	1	1	0

$MPS = \overline{a\bar{b} + \bar{a}\bar{c}}$

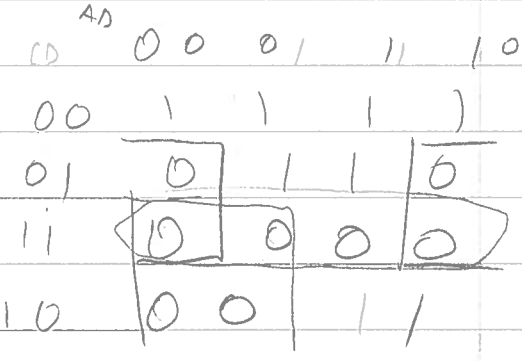
$= (\bar{a} + b)(\bar{a} + c)$

2

A	B	CD	R
0	0	0 0	1
0	0	0 1	0
0	0	1 0	x
0	0	1 1	0
0	1	0 0	1
0	1	0 1	1
0	1	1 0	0
0	1	1 1	0
1	0	0 0	1
1	0	0 1	0
1	0	1 0	1
1	0	1 1	0
1	1	0 0	1
1	1	0 1	1
1	1	1 0	1
1	1	1 1	0



MSP: $\bar{c}\bar{d} + b\bar{a} + a\bar{d}$



MPS: $\overline{cd + c\bar{a} + b\bar{d}}$

$= \overline{(\bar{c}+\bar{d})(\bar{c}+a)(b+\bar{d})}$

3.

w	x	y	z	f
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

yz \ wx	00	01	11	10
00	1	1	1	1
01	0	1	1	1
11	0	0	1	1
10	0	0	0	0

MSP: $\bar{y}\bar{z} + \bar{y}x + wz$

yz \ wx	00	01	11	10
00	1	1	1	1
01	0	1	1	1
11	0	0	1	1
10	0	0	0	0

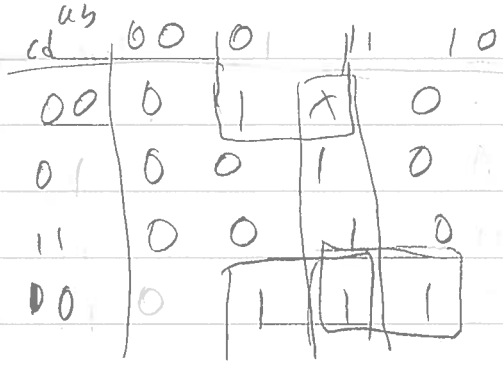
MPS: $\overline{\bar{y}\bar{z} + y\bar{w} + z\bar{w}\bar{x}}$

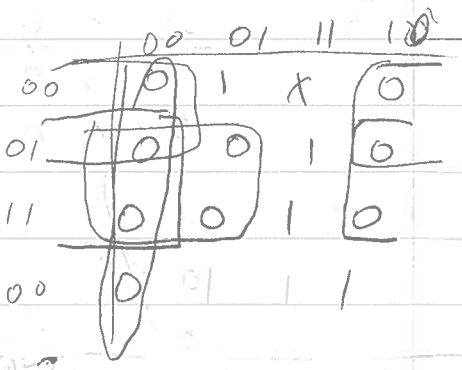
$= (\bar{y} + z)(\bar{y} + w)(z + w + x)$

MSP

MPS

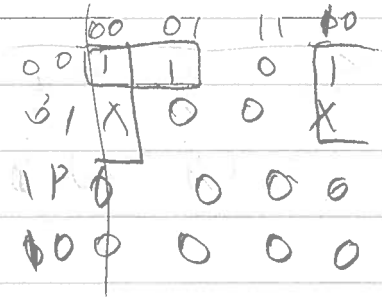
3. 1.

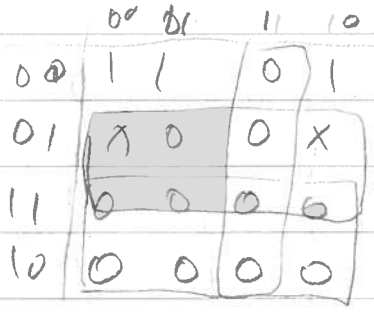




1. MSP: $ab + b\bar{d} + ac\bar{d}$
2. MPS: $(\bar{d} + b)(a+b)(b+c)(a+\bar{d})$
3. Yes, these are unique
4. MPS = MSP, the X is always 1.

2.





1. MSP: $\overline{b\bar{c} + \bar{a}c\bar{d}}$
2. MPS: $(\bar{a}+b)\bar{c}\,d$
3. Yes, unique
4. MSP ≠ MPS

4. 1. $(\bar{c} + d) + (\bar{a} + c) = \bar{a} + \bar{c} + d$

2. $\overline{a + \bar{c} + \bar{d}}$

3. $(\bar{a}\bar{c})(cd)(\bar{a}d) = 0$