Jalen Powell   09/15/21
Elec 2200
                        Hw 9

1. $Q = yz + xy + yz$
   $= yz + xy$

	x	y	z	yz	xy	yz + xy
0	0	0	0	0	0	0
1	0	0	1	0	0	0
2	0	1	0	0	0	0
3	0	1	1	1	0	1
4	1	0	0	0	0	0
5	1	0	1	0	0	0
6	1	1	0	0	1	1
7	1	1	1	1	1	1

$\leftarrow \bar{x}yz = 011 = 3_{10}$

$\leftarrow xy\bar{z} = 110 = 6_{10}$
$\leftarrow xyz = 111 = 7_{10}$

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

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

        $yz + xy$

2.

2. $\bar{x}\bar{y}z + wx\bar{z} + w\bar{y}z + \bar{w}xy$

	w	x	y	z	Q	
0	0	0	0	0	0	
1	0	0	0	1	1	← $\bar{w}\bar{x}\bar{y}z$
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	1	← $\bar{w}x y\bar{z}$
7	0	1	1	1	1	← $\bar{w}x y z$
8	1	0	0	0	0	
9	1	0	0	1	1	← $w\bar{x}\bar{y}z$
10	1	0	1	0	1	← $w\bar{x}y\bar{z}$
11	1	0	1	1	0	
12	1	1	0	0	1	← $wx\bar{y}\bar{z}$
13	1	1	0	1	0	
14	1	1	1	0	1	← $wxy\bar{z}$
15	1	1	1	1	0	

yz \ wx	00	01	11	10
00	0 (0)	0 (4)	1 (12)	0 (8)
01	1 (1)	0 (5)	0 (13)	1 (9)
11	0 (3)	1 (7)	0 (15)	0 (11)
10	0 (2)	1 (6)	1 (14)	1 (10)

$m(1, 6, 7, 9, 10, 12, 14)$

$M(0, 2, 3, 4, 5, 8, 11, 13, 15)$

3. $Q = m(0, 2, 3, 7, 8, 10, 11)$

K-map (wx across top, yz down the side):

yz \ wx	00	01	11	10
00	0 **1**	4 0	12 0	8 **1**
01	1 0	5 0	13 0	9 0
11	3 **1**	7 **1**	15 0	11 **1**
10	2 **1**	6 0	14 0	10 **1**

$$\bar{w}\bar{x}\bar{z} + \bar{w}yz + w\bar{x}y + w\bar{x}\bar{z}$$
$$\bar{x}\bar{z}(\bar{w}+w) + \bar{w}yz + w\bar{x}y$$
$$\bar{x}\bar{z} + \bar{w}yz + w\bar{x}y \longrightarrow \text{Simplified SOP}$$