2.15

(1) $Y_1 = C + ABC = C$

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

(2) $Y_2 = AB'C + BC + A'BC'D = A'BD + BC + AC$.

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

(3) $Y_3(A,B,C) = \Sigma m(1,2,3,7)$
$= A'B + A'C + BC$.

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

(4). $Y_4(A,B,C,D) = \Sigma m(0,1,2,3,4,6,8,9,10,11,14)$.
$= B' + A'D' + CD'$

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

2.16. (2). $Y = AB' + A'C + BC + C'D = AB' + D + C$.

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

(7). $Y(A,B,C,D) = \Sigma m(0,1,2,5,8,9,10,12,14)$

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

$= \cancel{AC'D} \; AD' + B'C' + \cancel{A}B'D' + A'C'D$

2.18. (a) $Y = \overline{\overline{A\bar{B}C}\ \ \overline{B\bar{C}}}$

$= \overline{(\bar{A}+B+\bar{C})\cdot(\bar{B}+C)}$

$= A\bar{B}C + B\bar{C}$

(b). $\overline{\overline{\bar{A}+C} + \overline{A+\bar{B}} + \overline{B+\bar{C}}}$

$= (\bar{A}+C)\cdot(A+\bar{B})\cdot(B+\bar{C})$

$= (\bar{A}\bar{B}+AC+\bar{B}C)\cdot(B+\bar{C})$

$= ABC + \bar{A}\bar{B}\bar{C}$

(c). $Y_1 = \overline{\overline{A\bar{B}} \cdot \overline{AC\bar{D}}}$

$= A\bar{B} + AC\bar{D}$

$Y_2 = \overline{\overline{A\bar{B}} \cdot \overline{A\bar{C}\bar{D}} \cdot \overline{\bar{A}\bar{C}D} \cdot \overline{ACD}}$

$= A\bar{B} + A\bar{C}\bar{D} + \bar{A}\bar{C}D + ACD.$

(d) $Y_1 = \overline{\overline{AB + C\cdot(A\oplus B)}}$

$= AB + C\cdot(A\bar{B}+\bar{A}B)$

$= AB + A\bar{B}C + \bar{A}BC$

$= AB + BC + AC.$

2.20. (1). $\begin{cases} Y_1 = AB'C' + ABC + A'B'C + A'BC' \\ A'B'C' + A'BC = 0. \end{cases}$

$A'(BC + B'C') = 0$

$\Rightarrow ABC:$ 100, 101, 110, 101.
001, 010

$\Rightarrow$

AB\C	0	1
00	X	1
01	1	X
11		
10	1	

$= A' + B'C' + BC.$

(2). $\begin{cases} Y_2 = (A+C+D)' + A'B'CD' + AB'C'D. \\ AB'CD' + AB'CD + ABC'D' + ABC'D + ABCD' + ABCD = 0. \end{cases}$

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

$= A' + \cancel{AB}\ AB'C'$

2.22. $Y_1 = \Sigma m_1 \quad Y_2 = \Sigma m_2$

$Y = Y_1 + Y_2 = \Sigma m_1 + \Sigma m_2$ $\Rightarrow$ 显然,对应相加.

$Y' = Y_1 \cdot Y_2 = \Sigma m_1 \cdot \Sigma m_2$ 不对应的位一定有形如 $A\cdot A' \Rightarrow 0$
对应的位相乘仍等于本身 $\Rightarrow$ 保留 $\Rightarrow$ 对应相乘

$Y'' = Y_1 \oplus Y_2 = \Sigma m_1 \oplus \Sigma m_2$ ~~若Y_1. Y_2均为0 ⇒ 无影响.~~

$= \Sigma m_1 \cdot \overline{\Sigma m_2} + \overline{\Sigma m_1} \cdot \Sigma m_2$ ~~若存在1(卡诺图中). 1⊕1=0 ⇒ 舍去.~~

显然,只需证: $\bar{Y} = \overline{\Sigma m_1}$ 对应为取反成立即可,而 ~~1⊕0=1~~
这是显然的, $\Rightarrow Y'' = Y_1 \oplus Y_2 = \Sigma m_1 \oplus \Sigma m_2$ 对应位置异或.

2.23. (1) $Y = (AB + A'C + B'D)\cdot(AB'C'D + A'CD + BCD + B'C') = AB'D + CD + A'B'C$.

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

$\cdot$

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

$\Rightarrow$

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

(2). $Y = (A'B'C + A'BC' + AC)\cdot(AB'C'D + A'BC + CD) = A'BC'D + ABCD$.

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

$\cdot$

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

$\Rightarrow$

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

(3). $Y = (A'D' + C'D + CD') \oplus (AC'D' + ABC + A'D + CD) = AB' + A'C + AD + C'D'$

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

$\oplus$

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

$\Rightarrow$

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

(4). $Y = (A'C'D' + B'D' + BD) \oplus (A'BD' + B'D + BCD') = B' + D + C$.

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

$\oplus$

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

$\Rightarrow$

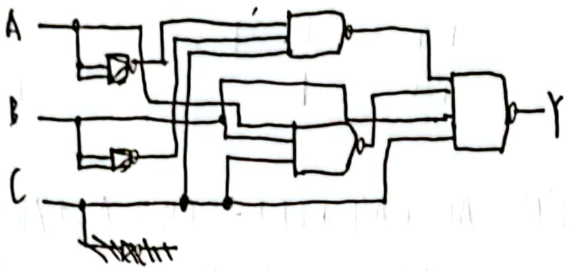
AB\CD	00	01	11	10
00	1	1	1	1
01		1	1	1
11		1	1	1
10	1	1	1	1

2.25.
$$\begin{cases} Y_1 = \Sigma m(0,8,9,10,11,14,15) = B'C'D' + AB' + AC \\ Y_2 = \Sigma m(0,2,3,6,7,10,11,12,13,15) = ABC' + A'B'D' + CD + A'C + B'C \\ Y_3 = \Sigma m(0,1,3,5,7,10,11,12,13,14,15) = A'B'C' + AB + CD + A'D + AC. \end{cases}$$

2.26(2). $Y = (A'+B)\cdot(A+B')\cdot C + (BC)'$

$= A'B'C + ABC + B' + C'$

$= \overline{\overline{A'B'C + ABC + B' + C'}} = \overline{(A'B'C)'\cdot(ABC)'\cdot B\cdot C}$



(3) $Y = (ABC' + AB'C + A'BC)'$

$\bar{Y} = ABC' + AB'C + A'BC$

$Y = A'B' + A'C' + AB'C' + ABC$

$= ((A'B')'(A'C')'(AB'C')'(ABC)')'$