

$$\begin{aligned}
 2.6 \quad a) \quad (X+Y)(X+\bar{Y}) &= X \cdot X + X \cdot \bar{Y} + Y \cdot X + Y \cdot \bar{Y} \\
 &= X + X \cdot \bar{Y} + X \cdot Y \quad (\because X \cdot X = X, Y \cdot \bar{Y} = 0) \\
 &= X(1 + \bar{Y} + Y) = \boxed{X} \quad (\because 1 + X = 1).
 \end{aligned}$$

$$\begin{aligned}
 b) \quad X(X+Y) &= X + X \cdot Y \quad (\because X \cdot X = X) \\
 &= X(1+Y) \quad (\because 1+Y = 1) \\
 &= X \cdot 1 = \boxed{X} \quad (\because X \cdot 1 = X).
 \end{aligned}$$

$$\begin{aligned}
 c) \quad (X+\bar{Y}) \cdot Y &= XY + \bar{Y} \cdot Y \\
 &= \boxed{XY} \quad (\because \bar{Y} \cdot Y = 0).
 \end{aligned}$$

$$\begin{aligned}
 d) \quad (X+Y)(\bar{X}+Z) &= X \cdot \bar{X} + X \cdot Z + Y \cdot \bar{X} + YZ \\
 &= \underline{XZ} + Y\bar{X} + YZ \\
 &= XZ(Y + \bar{Y}) + \bar{X}Y + (X + \bar{X})YZ \\
 &= XY\bar{Z} + X\bar{Y}\bar{Z} + \bar{X}Y + X\bar{Y}Z + \bar{X}YZ \\
 &= \underline{XY\bar{Z}} + \underline{X\bar{Y}\bar{Z}} + \bar{X}Y + \underline{\bar{X}YZ} \quad (\because X + X = X) \\
 &= XZ(Y + \bar{Y}) + \bar{X}Y(1 + Z) \\
 &= \boxed{XZ + \bar{X}Y} \quad (\because Y + \bar{Y} = 1, 1 \cdot A = A, 1 + Z = 1).
 \end{aligned}$$

$$2.1P. \quad f(A, B, C, D) = \sum m(0, 1, 2, \overset{011/15}{\cancel{7}}, 8, 9, 10, 15).$$

$$a) \quad f(A, B, C, D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD.$$

$$b) \quad f(A, B, C, D) = \prod M(3, 4, 5, \overset{6}{\cancel{7}}, 11, 12, 13, 14).$$

$$\begin{aligned}
 &= (A+B+\bar{C}+\bar{D})(A+\bar{B}+C+D)(A+\bar{B}+C+\bar{D})(A+\bar{B}+\bar{C}+D)(\bar{A}+B+\bar{C}+\bar{D}) \\
 &\quad \cdot (\bar{A}+\bar{B}+C+D) \cdot (\bar{A}+\bar{B}+C+\bar{D}) \cdot (\bar{A}+\bar{B}+C+D)
 \end{aligned}$$

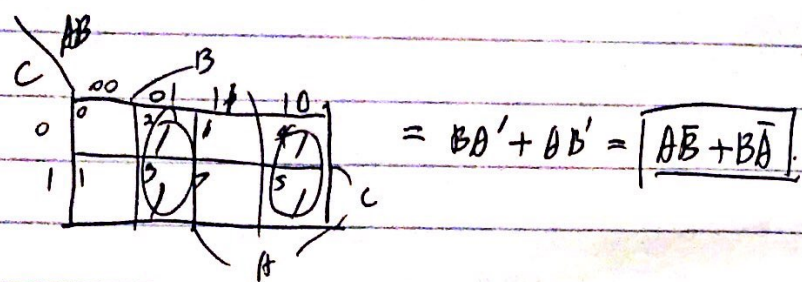
$$c) \quad f'(A, B, C, D) = \sum m(3, 4, 5, 6, 11, 12, 13, 14)$$

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

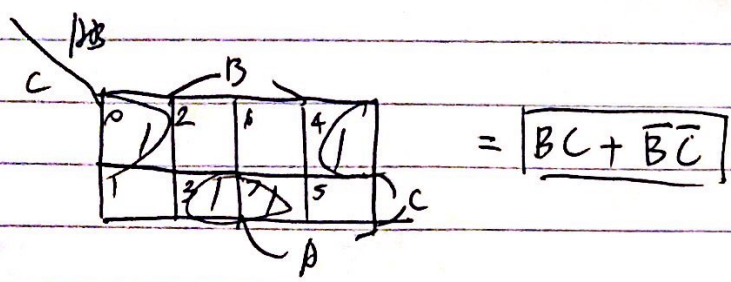
$$d) \quad f'(A, B, C, D) = \prod M(0, 1, 2, 7, 8, 9, 10, 15)$$

$$\begin{aligned}
 &= (\bar{A}+\bar{B}+\bar{C}+\bar{D}) \cdot (\bar{A}+\bar{B}+\bar{C}+D) \cdot (\bar{A}+\bar{B}+C+\bar{D}) \cdot (\bar{A}+\bar{B}+C+D) \cdot (\bar{A}+\bar{B}+\bar{C}+D) \\
 &\quad \cdot (\bar{A}+\bar{B}+C+\bar{D}) \cdot (\bar{A}+\bar{B}+C+\bar{D}) \cdot (\bar{A}+\bar{B}+C+D)
 \end{aligned}$$

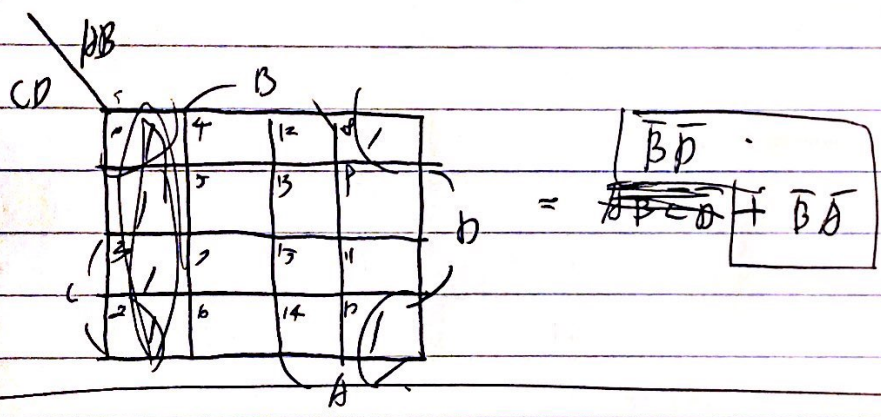
2.31 a) $W(A, B, C) = \sum m(2, 3, 4, 5)$



b) $X(A, B, C) = \sum m(0, 3, 4, 7)$

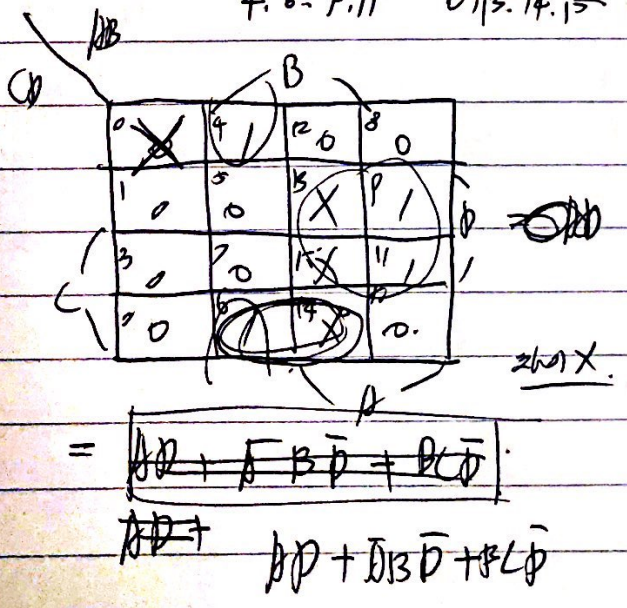


c) $Y(A, B, C, D) = \sum m(0, 1, 2, 3, 4, 10)$

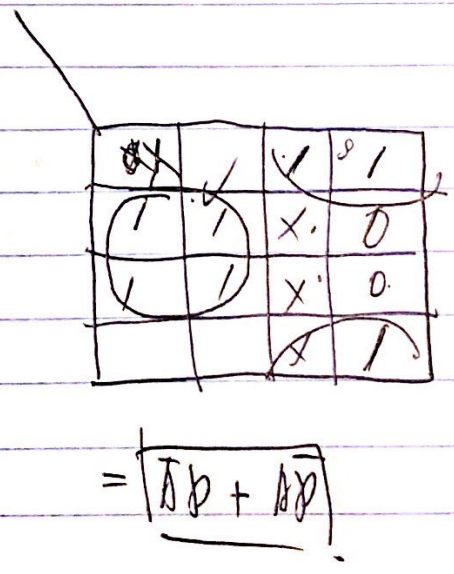


2.33.

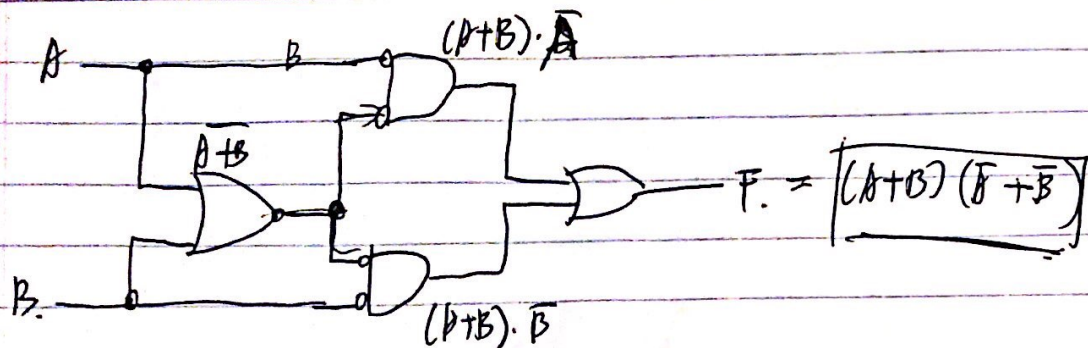
$f(d30) = \sum m(4, 6, 9, 11) + d(0, 1, 3, 14, 15)$



$f(d31) = \sum m(1, 3, 5, 7, 8, 10, 12) + d(0, 13, 14, 15)$



2.39.



2.40.

a)

	A	B	C	o_1	o_0
0	0	0	0	0	0
1			1	0	1
2		1	0	1	0
3			1	1	1
4	1	0	0	0	0
5			1	1	0
6		1	0	0	0
7			1	1	0

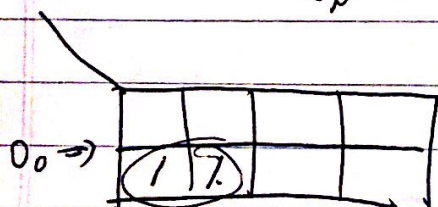
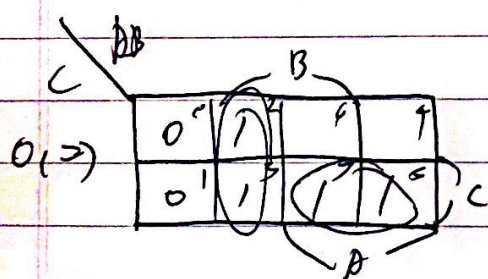
b)

	A	B	o_1	o_0
0	0	0	0	0
1	0	1	0	1
2	1	0	0	0
3	1	1	1	0

	A	B	C	o_1	o_0
0	0	0	0	0	0
1			1	1	1
2		1	0	0	0
3			1	1	1
4	1	0	0	0	0
5			1	0	0
6		1	0	1	1
7			1	1	1

2.41.

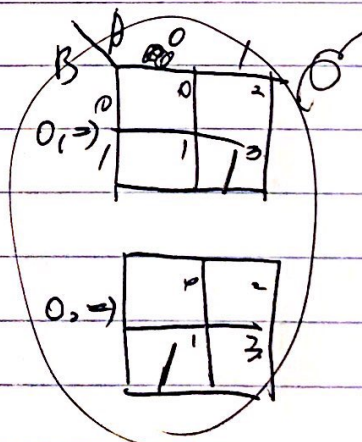
a) $o_1 = \sum m(2, 3, 5, 7)$
 $o_0 = \sum m(1, 3)$



$$o_1 = B\bar{A} + AC$$

$$o_0 = \bar{A}C$$

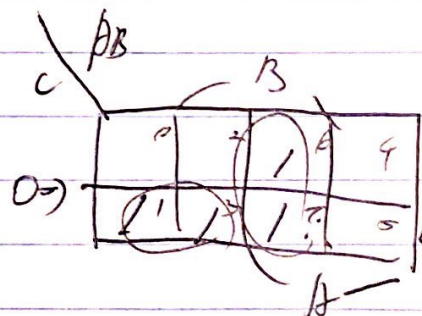
b) $o_1 = \sum m(3)$
 $o_0 = \sum m(1)$



$$o_1 = AB$$

$$o_0 = \bar{A}B$$

c) $o = \sum m(1, 3, 6, 7)$



$$o = AB + \bar{A}C$$