

1) $F(A, B, C, D) = \sum m(1, 4, 7, 12, 13) + \sum d(5, 14, 15)$

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

$$\begin{array}{r} 0001 \\ 0101 \\ \hline \bar{A} \bar{C} D \end{array}$$

$$\begin{array}{r} 0100 \\ 0101 \\ \hline \bar{A} B \bar{C} \end{array}$$

$$\begin{array}{r} 0101 \\ 0111 \\ 1101 \\ 1111 \\ \hline B D \end{array}$$

$$\begin{array}{r} 1110 \\ 1010 \\ \hline A C \bar{D} \end{array}$$

$$F(A, B, C, D) = (\bar{A} \bar{C} D) + (\bar{A} B \bar{C}) + (B D) + (A C \bar{D})$$

2) $F(W, X, Y, Z) = \sum m(1, 3, 7, 11, 15) + \sum d(0, 2, 5)$

WX \ YZ	00	01	11	10
00	X	1	1	X
01		X	1	
11			1	
10			1	

$$\begin{array}{r} 0000 \\ 0001 \\ 0011 \\ 0010 \\ \hline \bar{W} \bar{X} \end{array}$$

$$\begin{array}{r} 0011 \\ 0111 \\ 1111 \\ 1011 \\ \hline C D \end{array}$$

$$F(W, X, Y, Z) = (\bar{W} \bar{X}) + (C D)$$

c) $F(A, B, C, D) = \sum m(0, 1, 2, 3, 4, 5) + \sum d(11, 12, 13, 14, 15)$

CD \ AB	00	01	11	10
00	1 ₀	1 ₁	1 ₃	1 ₂
01	1 ₄	1 ₅		
11	X ₁₂	X ₁₃	X ₁₅	X ₁₄
10			X ₁₁	

$$\begin{array}{r} 0000 \\ 0001 \\ 0011 \\ 0010 \\ \hline \bar{A} \bar{B} \end{array}$$

$$\begin{array}{r} 0100 \\ 0101 \\ 1100 \\ 1101 \\ \hline B \bar{C} \end{array}$$

$$\underline{\underline{(\bar{A} \bar{B} + B \bar{C})}}$$