

06/11/21 Saturday

② Simplify $f(x, y) = \sum (0, 2, 3)$

Sol:-

	y	0	1
x	0	1	0
1	1	1	1

x	y
0	1
1	0

$$f(x, y) = y' + x$$

Verification:-

$$\begin{aligned} f(x, y) &= x'y' + xy' + xy \\ &= (x' + x)y' + xy \end{aligned}$$

1+2,3

$$\begin{aligned} &= 1 \cdot y' + xy \\ &= y' + xy \\ &= (y' + x) \cdot (y' + y) \\ &= y' + x \end{aligned}$$

③ Simplify $f(x, y, z) = \sum (2, 3, 4, 5)$

Sol:-

	yz	00	01	11	10
x	0	0	0	1	1
1	1	1	1	0	0

$\checkmark \checkmark \times$
0 1 1
0 1 0

$$\therefore f(x, y, z) = x'y + xy'$$

$\checkmark \checkmark \times$
1 0 0
1 0 1

Ver:-

$$\begin{aligned} f(x, y, z) &= \underbrace{x'y z' + x'y z + x y' z' + x y' z}_{= x'y(z' + z) + x y'(z' + z)} \\ &= x'y + x y' \\ &= x'y + x y' \end{aligned}$$

0 1 0
0 1 1
1 0 0
1 0 1

④ Simplify $f(a, b, c) = \sum (0, 1, 2, 4, 5, 7)$

Sol:-

	bc	00	01	11	10
a	0	1	1	0	1
1	1	1	1	1	0

1 1 1

0 0 0 X
0 0 1 X
0 1 0 X
1 0 0 X
1 0 1 ✓

$$\therefore f(a, b, c) = ac + a'c' + b'$$

$$\therefore f(a, b, c) = ac + a'c' + b'$$

⑤ Simplify $f(x, y, z) = x'y'z' + xyz' + xy'z$

Sol:-

$x \backslash yz$	00	01	11	10
0	1			
1	1			1

0	0	0
1	1	0
x	y	z
1	0	0

$$\therefore f(x, y, z) = y'z' + xz'$$

① Simplify $f(x, y, z) = \sum(0, 1, 2, 3, 5, 7)$

Sol:-

$x \backslash yz$	00	01	11	10
0	1	1	1	1
1		1	1	

$$\therefore f(x, y, z) = x' + z \quad \text{---} \quad x'y'$$

Ver:-

$$f(x, y, z) = \overbrace{x'y'z' + x'y'z + \underline{x'y'z'}}_{x'y'} + \overbrace{\underline{x'yz} + x y'z + x yz}_{xz}$$

$$\begin{aligned}
 &= \underline{x'y' + x'y} + xz \\
 &= x'(y' + y) + xz \\
 &= (x' + x) \cdot (x' + z) \\
 &= x' + z
 \end{aligned}$$