$$① \quad \underline{x\bar{y}}\bar{z} + xyw + \underline{x\bar{y}}z\bar{w} \equiv$$ (~~łączności~~) (rozdzielnoś

$$x\bar{y}\left(\underline{\bar{z} + z\bar{w}}\right) + xyw \equiv$$ (rozdzielności)

$$x\bar{y}\left[\underbrace{(\bar{z}+z)}_{1}(\bar{z}+\bar{w})\right] + xyw \equiv$$ (el. anihilujący)

$$x\bar{y}(\bar{z}+\bar{w}) + xyw \equiv$$ (rozdzielności)

$$x\bar{y}\bar{z} + x\bar{y}\bar{w} + xyw$$

② $\underline{(x+z+w)}(x+\bar{y}+z)\underline{(x+\bar{y}+\bar{z}+w)} \equiv$ (rozdzielności)

$[(x+w)+(z)][(x+w)+(\bar{y}+\bar{z})](x+\bar{y}+\bar{z}) \equiv$ (łączności)

$[(x+w)+z(\bar{y}+\bar{z})](x+\bar{y}+\bar{z}) \equiv$ (rozdzielności)

$[(x+w)+(z\bar{y})+\underbrace{(z\bar{z})}_{0}](x+\bar{y}+\bar{z}) \equiv$ (el. anihilujący)

$[(x+w)+(z\bar{y})](x+\bar{y}+\bar{z}) \equiv$ (rozdzielności)

$(x+w+z)(x+w+\bar{y})(x+\bar{y}+\bar{z})$

③ $\sum m(1,3,4,6,7) = \overset{6}{xy\bar{z}} + \overset{1}{\bar{x}\bar{y}z} + \overset{3}{\bar{x}yz} + \overset{4}{x\bar{y}\bar{z}} + \overset{7}{xyz} \equiv$

$\overset{6\,;\,7}{xy}\underbrace{(\bar{z}+z)}_{1} + \overset{1\,;\,3}{\bar{x}}(\bar{y}z+yz) + \overset{4}{x\bar{y}\bar{z}} \equiv$

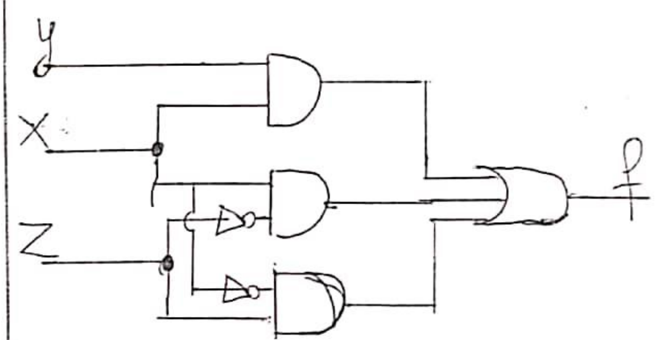
$xy + \bar{x}(z(\bar{y}+y)) + x\bar{y}\bar{z} \equiv$

$xy + \bar{x}z + x\bar{y}\bar{z} \equiv$

$x(y+\bar{y}\bar{z}) + \bar{x}z \equiv$

$x[(y+\bar{y})(y+\bar{z})] + \bar{x}z \equiv$

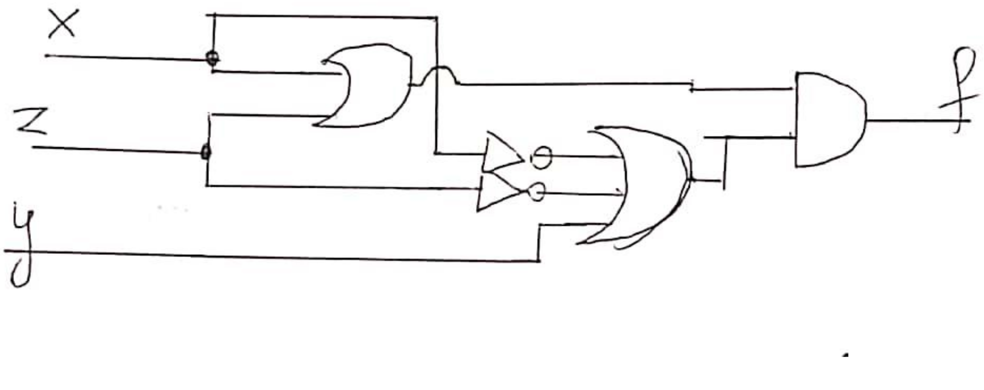
$xy + x\bar{z} + \bar{x}z$



$$\text{(5)}\quad \overset{0}{(x+y+z)}\,\overset{2}{(x+\bar{y}+z)}\,\overset{5}{(\bar{x}+y+\bar{z})} = \prod M(0,2,5)$$

$$[(x+z)\cancel{+}(y\bar{y})](\bar{x}+y+\bar{z}) =$$

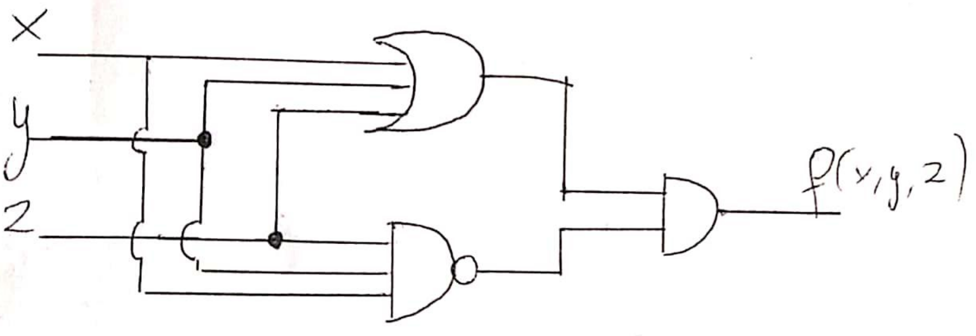
$$(x+z)(\bar{x}+y+\bar{z})$$



(5) $f(x,y,z) = 0 \Leftrightarrow x = y = z = 1 \lor x = y = z = 0$

$\neg(x \land y \land z) \land \neg(\neg x \land \neg y \land \neg z)$

$\neg(x \land y \land z) \land (x \lor y \lor z)$

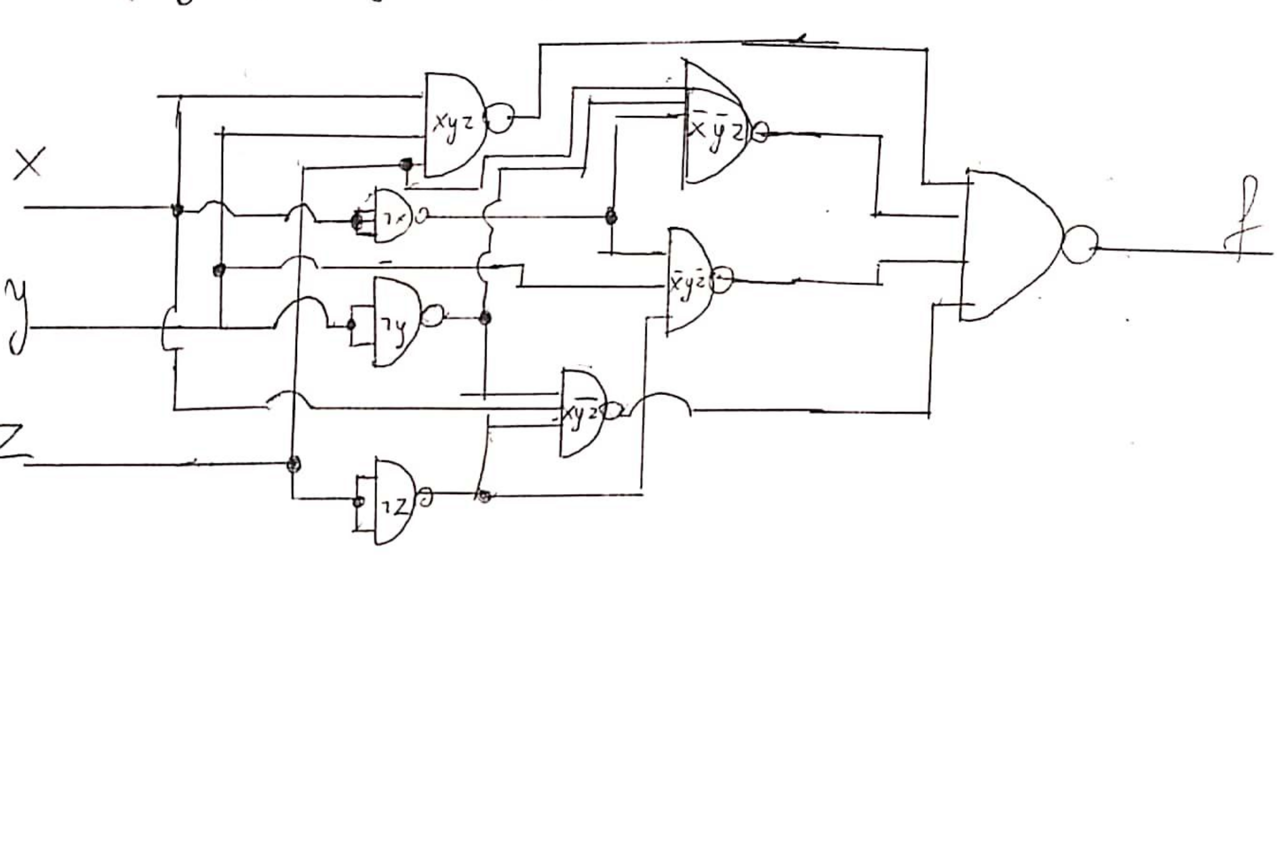


$$⑥\ \sum m(1,2,4,7) = \overset{1}{\bar{x}\bar{y}z} + \overset{2}{\bar{x}y\bar{z}} + \overset{4}{x\bar{y}\bar{z}} + xyz$$

$$\equiv \overline{\overline{(\bar{x}\bar{y}z + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xyz)}}$$

- podwójne negacje → de Morgan

$$\equiv \overline{(\overline{\bar{x}\bar{y}z})(\overline{\bar{x}y\bar{z}})(\overline{x\bar{y}\bar{z}})(\overline{xyz})}$$



7

zw \ xy	00	01	11	10
00	x	0	1	1
01	x	x	1	0
11	0	x	1	1
10	x	0	x	x

→

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

$\bar{f} = \bar{x} + \bar{y}\bar{z}w$ de Morgan

$f = \overline{\bar{x} + \bar{y}\bar{z}w} = (\bar{\bar{x}})(\overline{\bar{y}\bar{z}w}) = (x)(y+z+\bar{w})$

8 Gdybyśmy narysowali mapę tak:

zw \ xy	00	01	11	10
00	X	0	1	1
01	X	X	1	0
11	0	X	1	1
10	X	0	X	X

$f = x(\bar{x}+y+z+\bar{w})$

to wtedy gdy $x=y=z=0$ i $w=1$

i zamienię się na 1 występuje glitch.

Można to naprawić łącząc 1001 i 0001 w grupę

wtedy $f=(x)(y+z+\bar{w})$