PRACTICA3

1)

a)

1) Probar

$$C^{n-1}_{r-1} + C^{n-1}_{r} \Rightarrow C^{n}_{r}$$

$$\Rightarrow \quad n-1 \geq r > 1$$

Para probar tomaremos un valor $r = n - 2$

$$\underbrace{n-2}_{no} > -1$$

$$C^{n-1}_{n-3} + C^{n-1}_{n-2} = C^{n}_{n-2}$$

$$\frac{(n-1)!}{(n-3)!\,(2)!} + \frac{(n-1)!}{(n-2)!\,1!} = \frac{n!}{(n-2)!\,2!}$$

$$\frac{(n-1)(n-2)}{2} + (n-1) = \frac{n(n-1)}{2}$$

$$(n-1)\left(\frac{n-2}{2} + \frac{2}{2}\right) = \frac{n(n-1)}{2}$$

$$(n-1)\left(\frac{n}{2}\right) = \frac{n(n-1)}{2}$$

$$\frac{n(n-1)}{2} = \frac{n(n-1)}{2}$$

2)

a)

2) a) $(2x - y^2)^7$

$Mx^a y^4 \quad Nx^3 y^b$

Hallar $M - N$

$a' = 2x$

$b' = -y^2$

$(a' + b')^7$

$Mx^a(-y^2)^2 = C^7_2 (2x)^5 (-y^2)^2$

$a = 5$

$\frac{7 . 6}{2}(32x^5)(y^4)$

$672x^5 y^4$

▸ $M = 672$

$Nx^3 y^b$

$N(2x)^3(-y^2)^4$

$C^7_4 (2x)^3 (-y^2)^4$

$\frac{7 . 6 . 5}{3 . 2}(8x^3)(y^8)$

$280x^3 y^8$

▸ $N = 280$

$M - N = 672 - 280 = 392$

3)

3) $\sum_{k=0}^{n} \binom{k+3}{3} = \binom{n+4}{4}$

1) Caso base $k=1$

$$\sum_{k=0}^{1} \binom{3}{3} + \binom{4}{3} = \binom{5}{4}$$

$$1 + 4 = 5$$

2) Caso $n=k$

$$\sum_{k=0}^{n=k} = \binom{k+4}{4}$$

3) Caso $n=k+1$

$$\sum_{k=0}^{k+1} = \binom{k+5}{4} = \binom{k+4}{4} + \underbrace{\binom{k+4}{3}}_{\text{caso } k+1}$$

$$\frac{(k+4)!}{4!\,k!} + \frac{(k+4)!}{3!\,(k+1)!} = \frac{(k+5)!}{4!\,(k+1)!}$$

$$\frac{[(k+4)(k+3)(k+2)](k+1)}{4!} + \frac{[(k+4)(k+3)(k+2)]\cdot 4}{3!\cdot 4}$$

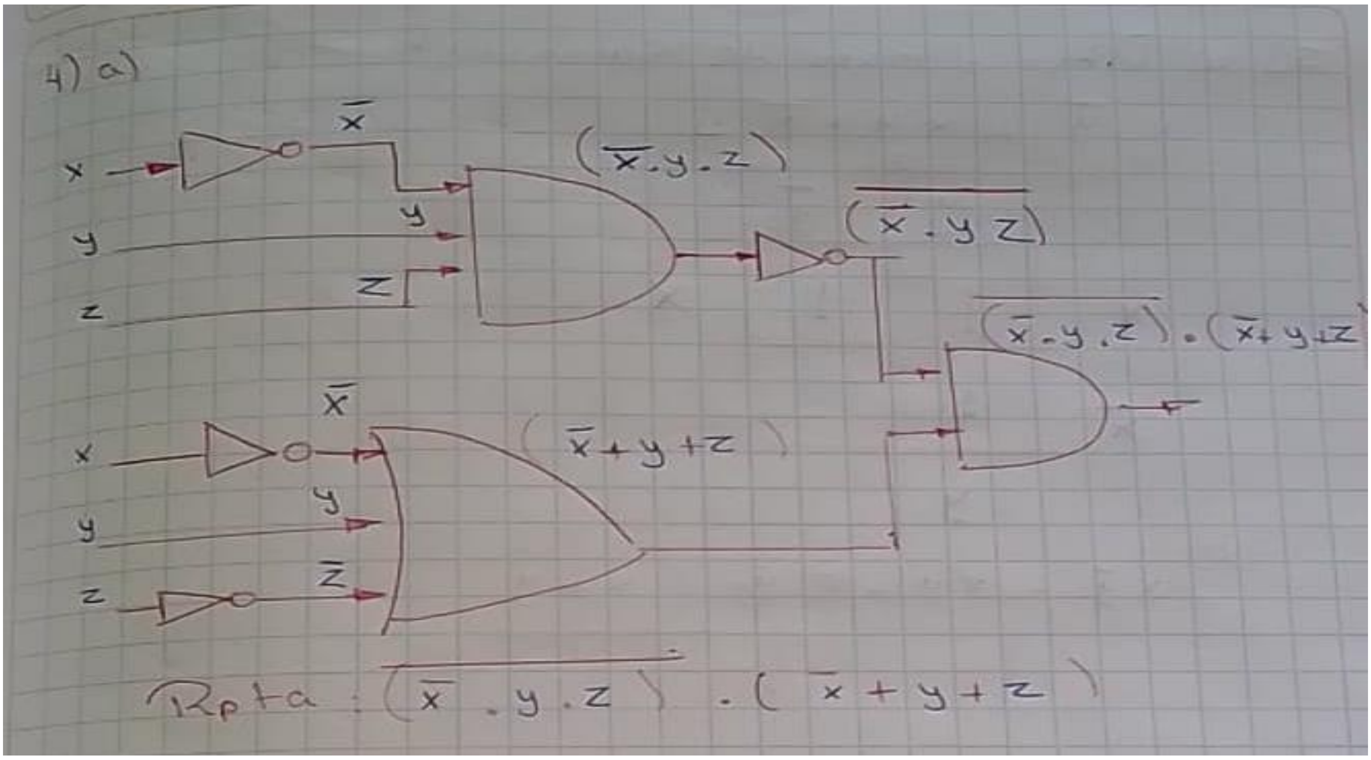
$$\frac{[(k+1)+4][(k+4)(k+3)(k+2)]}{4!}$$

$$\frac{(k+5)(k+4)(k+3)(k+2)}{4!} = \frac{(k+5)(k+4)(k+3)(k+2)\cancel{(k+1)}!}{4!\,\cancel{(k+1)}!}$$

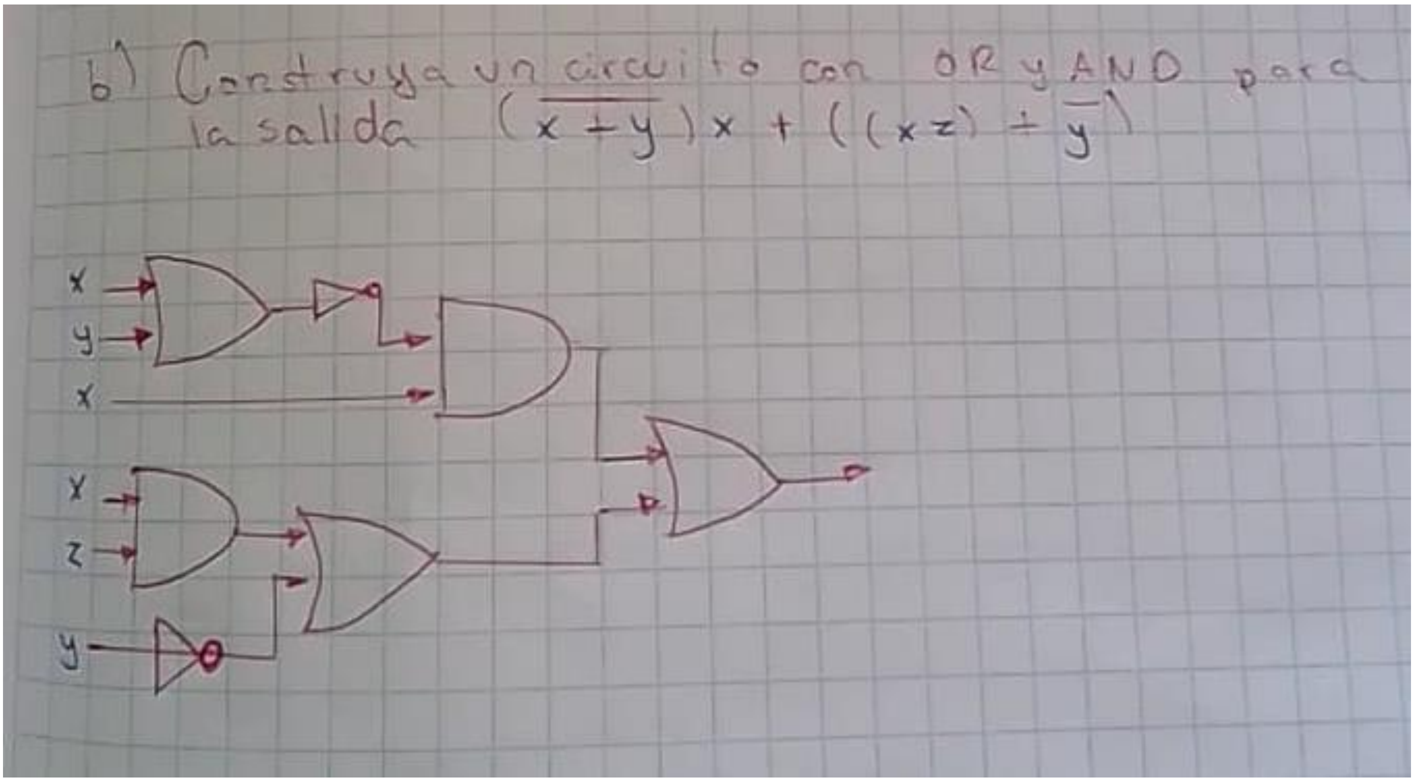
$$\frac{(k+5)(k+4)(k+3)(k+2)}{4!} = \frac{(k+5)(k+4)(k+3)(k+2)}{4!}$$

4)

a)

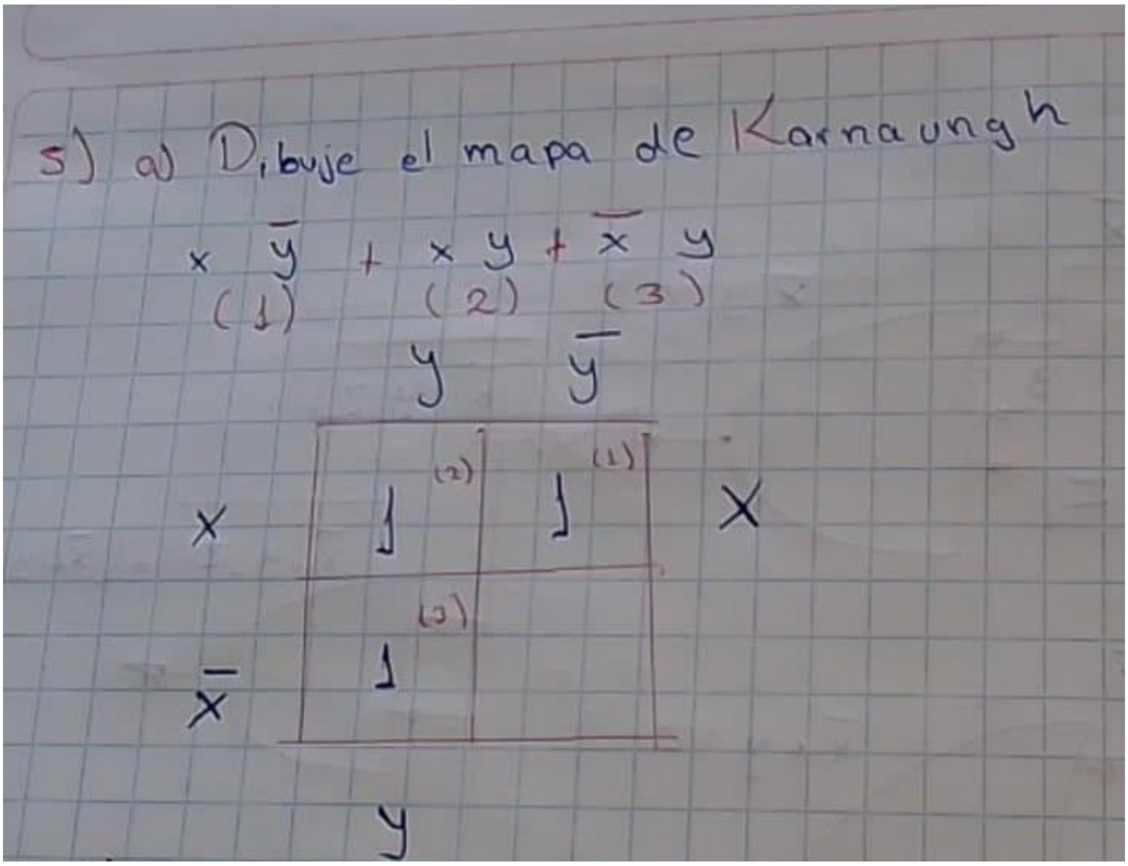

4) a)
x
y
z
$\bar{x}$
$(\bar{x}.y.z)$
$\overline{(\bar{x}.y\,z)}$
$\overline{(\bar{x}.y.z)}\cdot(\bar{x}+y+z)$
x
y
z
$\bar{x}$
y
$\bar{z}$
$(\bar{x}+y+z)$
Rpta: $\overline{(\bar{x}.y.z)}\cdot(\bar{x}+y+z)$

b)


b) Construya un circuito con OR y AND para la salida $(\overline{x+y})x + ((xz)+\bar{y})$
x
y
x
x
z
y

5)

a)

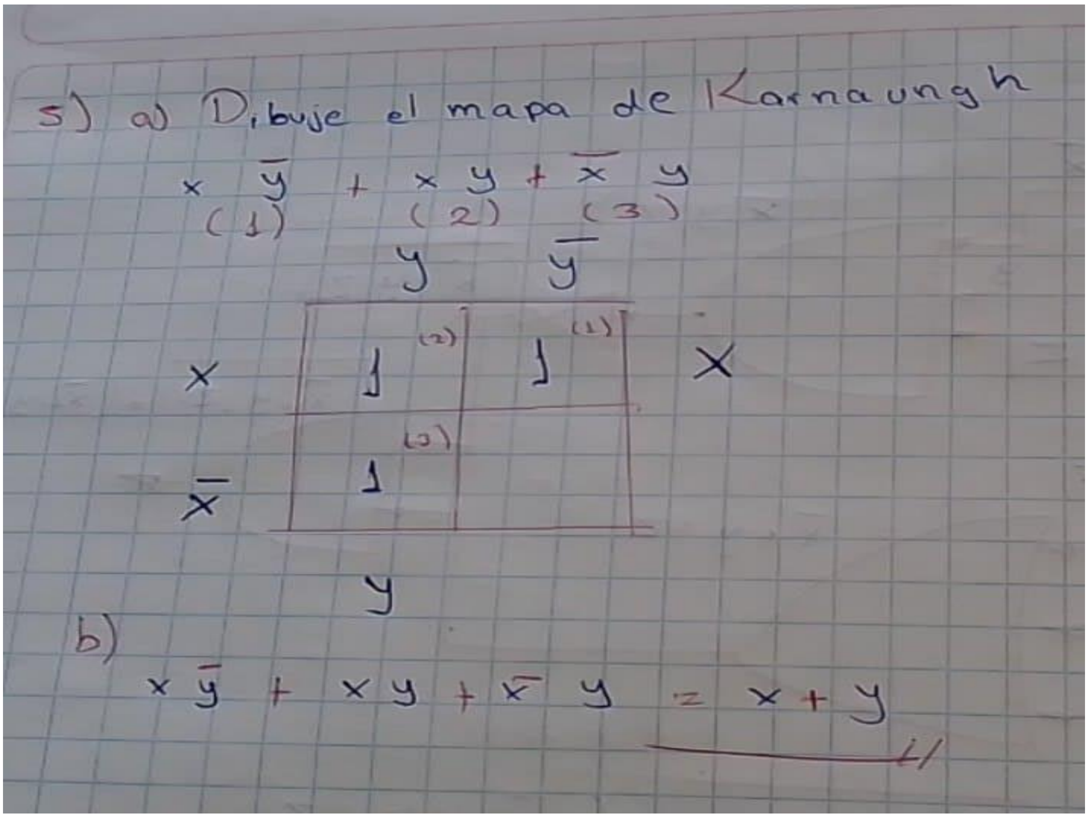


5) a) Dibuje el mapa de Karnaungh

$$\underset{(1)}{x\bar{y}} + \underset{(2)}{xy} + \underset{(3)}{\bar{x}y}$$

	y	$\bar{y}$
x	1 (2)	1 (1)
$\bar{x}$	1 (3)	

b)



5) a) Dibuje el mapa de Karnaungh

$$\underset{(1)}{x\bar{y}} + \underset{(2)}{xy} + \underset{(3)}{\bar{x}y}$$

	y	$\bar{y}$
x	1 (2)	1 (1)
$\bar{x}$	1 (3)	

b)

$$x\bar{y} + xy + \bar{x}y = x + y \;//$$