RAZONAMIENTO LOGICO MATEMATICO

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Actividad N° 1

trabajo en grupo

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Ejercicios

Ejercicios

1.-) Resolver

a. $4x^2 - 20x + 17 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Donde

$a = 4$, $b = -20$, $c = 17$

$$x = \frac{20 \pm \sqrt{400 - 4(4)(17)}}{8}$$

$$x = \frac{5}{2} \pm \sqrt{2}$$

b. $3x^2 - 6x = 5$

$3x^2 - 6x - 5 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{6 \pm \sqrt{36 - 4(3)(-5)}}{6}$$

$$x = 1 \pm \frac{2\sqrt{6}}{3}$$

c. $x^2 + x + 1 = 0$

$\Delta < 0 \rightarrow$ resultado imaginário

$x = \dfrac{-1 \pm \sqrt{1 - 4.1(1)}}{2}$

$x = -\dfrac{1}{2} \pm \sqrt{3}\, i$

d. $2x^2 - 3x - 5 = -3$

$2x^2 - 3x - 2 = 0$

$2x \qquad\qquad 1 = x$

$x \qquad\qquad -2 = -4x$

$\qquad\qquad\qquad\quad -3x$

$(2x + 1)(x - 2) = 0$

$x = -\dfrac{1}{2} \qquad \wedge \qquad x = 2$

e. $x^2 - x = 20$

1° forma

$x^2 - x - 20 = 0$

$x \qquad\quad -5 = -5x$

$x \qquad\quad +4 = +4x$

$\qquad\qquad\qquad -x$

$(x - 5)(x + 4) = 0$

$x = 5 \qquad \wedge \qquad x = -4$

2° forma

$x^2 - x = 20$ $\begin{cases} x(x - 1) = 5(4) \\ \qquad x = 5 \\ \\ x(x - 1) = -4(-5) \\ \qquad x = -4 \end{cases}$
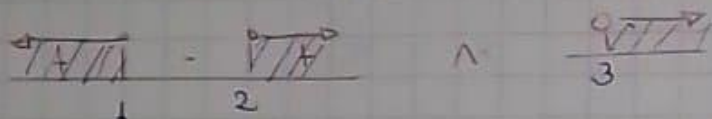
2.) Resolver

a.) $\dfrac{x^2 - 3x + 2}{x - 3} \geq 0$

$a \Rightarrow (x - 2)(x - 1) \geq 0$

$b \Rightarrow (x - 3)$

$\dfrac{a}{b} > 0$
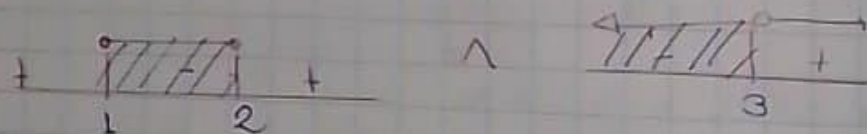
$\left[(a \geq 0 \wedge b > 0) \vee (a \leq 0 \wedge b < 0) \right]$

$\underbrace{}_{1°} \qquad \underbrace{\phantom{(a \leq 0 \wedge b < 0)}}_{2°}$

$1° (x - 2)(x - 1) \geq 0 \wedge x - 3 > 0$

$\langle 3, +\infty \rangle$

$2° (x - 2)(x - 1) \leq 0 \wedge (x - 3) < 0$

$[1, 2]$

$1° \vee 2° = 1° \cup 2° = [1, 2] \cup]3, +\infty\rangle$

b. $\dfrac{3}{x-1} < \dfrac{2}{x}$

$\dfrac{3}{x-1} - \dfrac{2}{x} < 0$

$\dfrac{x+2}{(x-1)(x)} < 0$

$a = x+2$

$b = (x-1)(x)$

$\dfrac{a}{b} < 0$

$\Big[\underbrace{(a > 0 \;\wedge\; b < 0)}_{1^o} \;\vee\; \underbrace{(a < 0 \;\wedge\; b > 0)}_{2^o}$

$1^o \quad (x+2) > 0 \;\wedge\; (x-1)x < 0$

$\langle 0 , 1 \rangle$

$2^o \quad (x+2) < 0 \qquad\wedge\qquad (x-1)\,x > 0$

$\langle -\infty , -2 \rangle$

$1^o \vee 2^o = 1^o \cup 2^o = \,]\infty, -2\rangle \cup \langle 0 , 1 \rangle$

c. $\dfrac{x}{x+4} \leq \dfrac{1}{x+1}$

$\dfrac{x}{x+4} - \dfrac{1}{x+1} \leq 0$

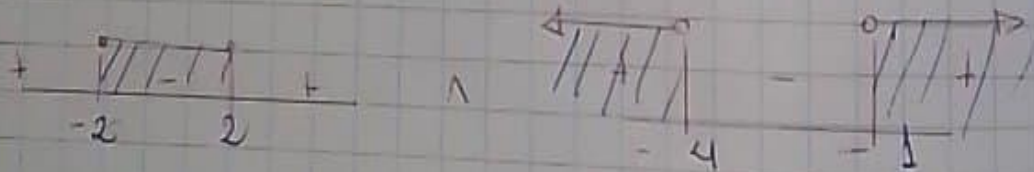$a = (x+2)(x-2)$

$\dfrac{(x+2)(x-2)}{(x+4)(x+1)} \leq 0$ $b = (x+4)(x+1)$

$\dfrac{a}{b} \leq 0$

$[(a \geq 0 \wedge b < 0) \vee (a \leq 0 \wedge b > 0)]$
  $\underbrace{\qquad\qquad}_{1°}$ $\underbrace{\qquad\qquad}_{2°}$

1° $(x+2)(x-2) \geq 0$ $\wedge$ $(x+4)(x+1) < 0$

$\langle -4, -2]$

2° $(x+2)(x-2) \leq 0$ $\wedge$ $(x+4)(x+1) > 0$

$\langle -1, 2]$

1° $\vee$ 2° = 1° $\cup$ 2° = $\langle -4, -2] \cup \langle -1, 2]$

d. $\dfrac{x^2 - 4x + 4}{x + 4} < 0$

$\dfrac{(x-2)^2}{(x+4)} < 0$ $a = (x+2)^2$

$\dfrac{a}{b} < 0$ $b = (x+4)$

$[\, (a > 0 \wedge b < 0) \vee (a < 0 \wedge b > 0)\,]$

           $\underbrace{\qquad\qquad}_{1^\circ}$ $\underbrace{\qquad\qquad}_{2^\circ}$

$1^\circ \quad (x - 2)^2 > 0 \qquad \wedge \qquad x + 4 < 0$

$\mathbb{R} - \{2\} \qquad\qquad \wedge \qquad \dfrac{\overset{\circ}{\blacktriangle\!/\!/\!/\!/\!}}{-4}$

$\qquad\qquad\qquad\qquad\qquad\qquad \langle -\infty, -4 \rangle$

$2^\circ \quad (x - 2)^2 < 0 \qquad\qquad \wedge \qquad (x + 4) > 0$

$\qquad\quad \phi \qquad\qquad\qquad \wedge \qquad \dfrac{\overset{\circ}{\blacktriangleleft\!/\!/\!/\!}}{-4}$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad \phi$

$1^\circ \vee 2^\circ = 1^\circ \cup 2^\circ = \langle -\infty, -4 \rangle$

c) $\dfrac{x+7}{x-3} > 0$

$\dfrac{a}{b} > 0$ $a = x+7$
           $b = x-3$

$[(a > 0 \wedge b > 0) \vee (a < 0 \wedge b < 0)]$
$\underbrace{\qquad\qquad}_{1^\circ}$ $\underbrace{\qquad\qquad}_{2^\circ}$

$1^\circ \ (x+7) > 0 \qquad \wedge \qquad x - 3 > 0$

$x > -7 \qquad \wedge \qquad x > 3$

$\langle 3, +\infty \rangle$

$2^\circ \ (x+7) < 0 \qquad \wedge \qquad x - 3 < 0$

$x < -7 \qquad \wedge \qquad x < 3$

$\langle -\infty, -7 \rangle$

$1^\circ \vee 2^\circ = 1^\circ \cup 2^\circ = \langle -\infty, -7 \rangle \cup \langle 3, +\infty \rangle$

3 Resolver

a. $x^2 - 3x + 2 > 0$

$(x - 2)(x - 1) > 0$

$$\langle -\infty, +1 \rangle \cup \langle 2, +\infty \rangle$$

b) $-x^2 + 3x - 2 > 0$

$0 > x^2 - 3x + 2$

$\quad x \qquad -2$

$\quad x \qquad -1$

$0 > (x-2)(x-1)$
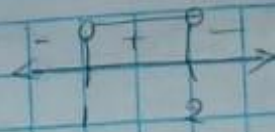
C.S.: $\langle 1, 2 \rangle$

c) $x^2 + 8x + 16 \leq 0$

$\quad x \qquad +4$

$\quad x \qquad +4$

$(x+4)(x+4) \leq 0$

$(x+4)^2 \leq 0$

C.S.: $\{4\}$

d) $2x^2 + 5x + 4 < 0$

$\Delta = 25 - 4(4)(2)$

$\Delta = -7$

C.S.: No tiene soluciones $\Rightarrow \{\emptyset\}$
reales

e) $4x^2 + 2x - 5 > 0$

$x = \dfrac{-2 \pm \sqrt{4 - 4(-5)(4)}}{8}$

$x = \dfrac{-2 \pm \sqrt{84}}{8}$

$x = \dfrac{-2 \pm 2\sqrt{21}}{8}$

$x_1 = \dfrac{\sqrt{21} - 1}{4}$

$x_2 = \dfrac{-\sqrt{21} - 1}{4}$
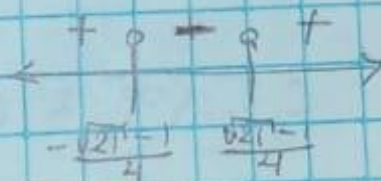
C.S.: $\left\langle \infty; \dfrac{-\sqrt{21}-1}{4} \right\rangle \cup \left\langle \dfrac{\sqrt{21}-1}{4}; \infty \right\rangle$

f) $-5x^2 - 2x + 3 \leq 0$

$-5x \qquad +3$

$x \qquad +1$
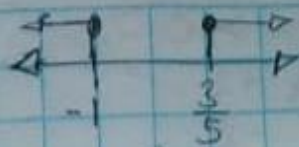
$(3-5x)(x+1) \leq 0$ C.S.: $\langle \infty; -1] \cup [3/5; \infty^+ \rangle$

g) $\dfrac{x-2}{x+4} \geq \dfrac{2}{x+4}$
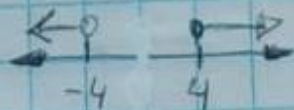
$x \neq -4$ C.S.: $\langle \infty; -4 \rangle \cup [4; \infty^+ \rangle$

$x \geq 4$ $(x-2)(x+4) \geq 2(x+4)$

$\qquad\qquad (x-4)(x+4) \geq 0$

$\qquad\qquad x^2 - 16 \geq 0$

h) $\dfrac{(2-x)^3 (x-5)^{12}}{(x-4)^2} \geq 0$

$2 - x = 0$

$x = 2$

$x - 5 = 0$ C.S.: $\langle \infty; 2] \cup \{5\}$

$x = 5$

$x \neq 4$
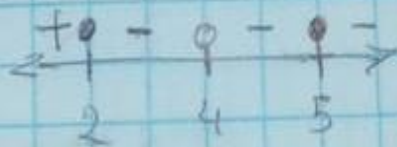
i) $\dfrac{(x-2)^{④ PAR}(x+1)^{⑥ PAR}}{(x-8)^{⑭ PAR}} < 0$ imposible < 0

$x \neq 8$ C.S.: $\{\phi\}$

4) • $X(X+1) = 6$ $\qquad$ Esta mal

$X^2 + X - 6 = 0$
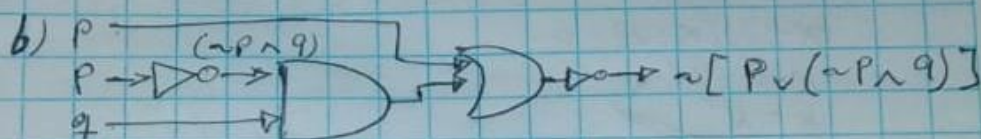
| X | 3 |
| X | -2 |

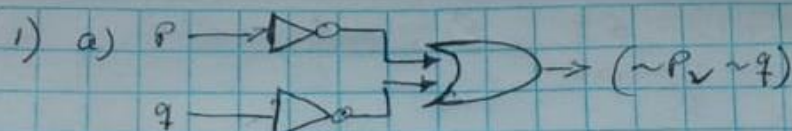$(X+3)(X-2) = 0$

$X = -3$

$X = 2$

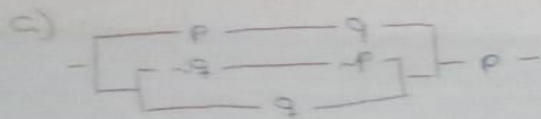5) • $X^2 = 2X$ $\qquad$ Esta mal
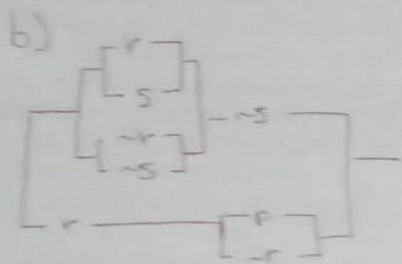
$X^2 - 2X = 0$

$X(X-2) = 0$

$X = 0$

$X = 2$

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1) a) P ——▷o— ... —▷ $(\sim P \vee \sim q)$

q ——▷o—

b) P —
P —▷o—→ $(\sim P \wedge q)$ ... —▷o—→ $\sim[P \vee (\sim P \wedge q)]$
q —

c) P
q —
t —▷o— ... —▷o—→ $\sim[P \wedge (q \vee \sim t)]$
$(q \vee \sim t)$

d) P —▷o— $(\sim P \wedge \sim q)$ ... —→ $(\sim P \wedge \sim q) \vee (P \wedge t)$
q —▷o—
P — $(P \wedge t)$
t —
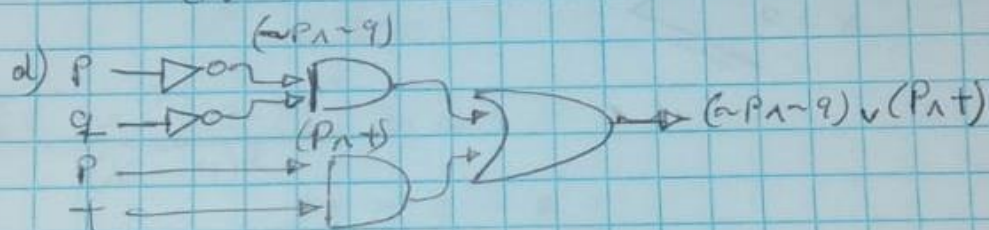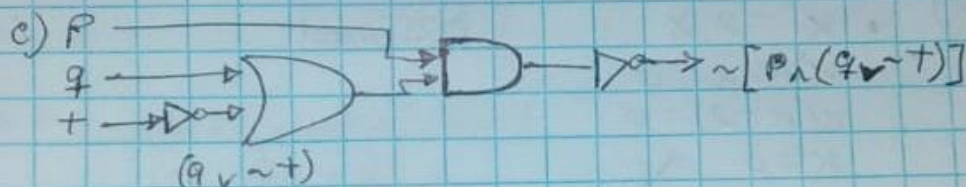
② COUSTRUIR UN CIRCUITO UTILIZANDO LAS PUERTAS DEL INVERSOR OR y AND
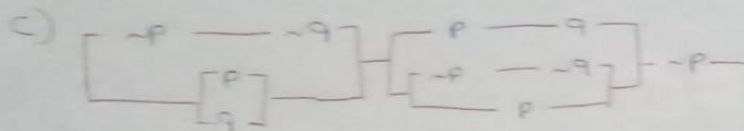
a) P ...
T, q, T ...

b) P, r, q ...
q, r, P ...
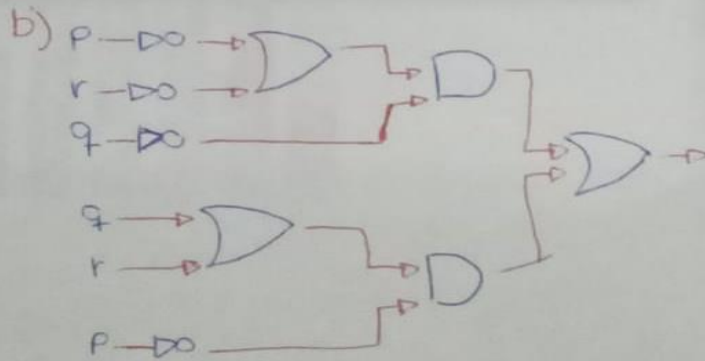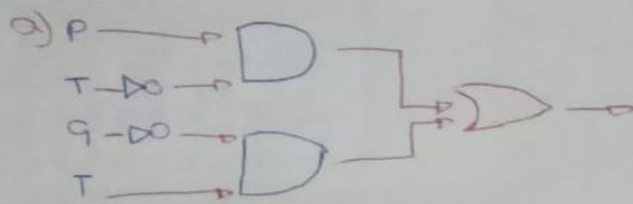
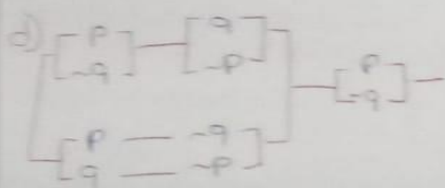3.-) SIMPLIFICAR Y DETERMINAR EL EQUIVALENTE A LOS CIRCUI

a)

$(P \wedge q) \vee [(\sim q \wedge \sim P) \vee q] \wedge P$

b)

$\{[(r \vee s) \vee (\sim r \vee \sim s)] \wedge \sim s\} \vee [r \wedge (P \vee \sim r)]$

c)

$[(\sim P \wedge \sim q) \vee (P \vee q)] \wedge \{[(P \wedge q) \vee ((\sim P \wedge \sim q) \vee P)] \wedge \sim P\}$

d)

$\{[(P \vee \sim q) \wedge (q \vee \sim P)] \vee [(P \wedge q) \vee (q \wedge \sim P)]\} \wedge (P \vee \sim q)$

4.) TOM COMPRO UNA CASA HACE 8 AÑOS EN 42,000 $; ESTE
AÑO SE EVALUO EN 67,500 $

a.) UNA ECUACION LINEAL $V = mt + b$, $0 \leq T \leq 15$ REPRESENTA
EL VALOR V DE LA CASA DURANTE 15 AÑOS A PARTIR DE
QUE FUE COMPRADO

$$67500 = 8m + 42000 \qquad V = 15 \cdot 3187,5 + 42000$$

$$3187.5 = m \qquad\qquad V = 89812.5$$
$$42000 = b$$

b) GRAFIQUE LA ECUACION Y MARQUELA PARA ESTIMAR
EN CUANTOS AÑOS, A PARTIR DE LA COMPRA ESTA
CASA TENDRA UN VALOR DE 72,500 $

$$72500 = 3187.5 \cdot t + 42000$$

$$\underline{10}\!\!\!/- 9,56 = T$$

c) PLANTEE Y RESUELVE UNA ECUACION DE FORMA
ALGEBRAICA PARA DETERMINAR CUANTOS AÑOS
A PARTIR DE LA COMPRA ESTA CASA TENDRA UN
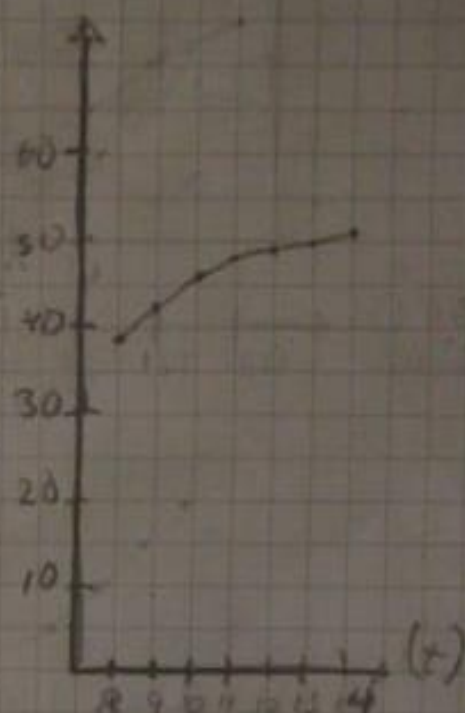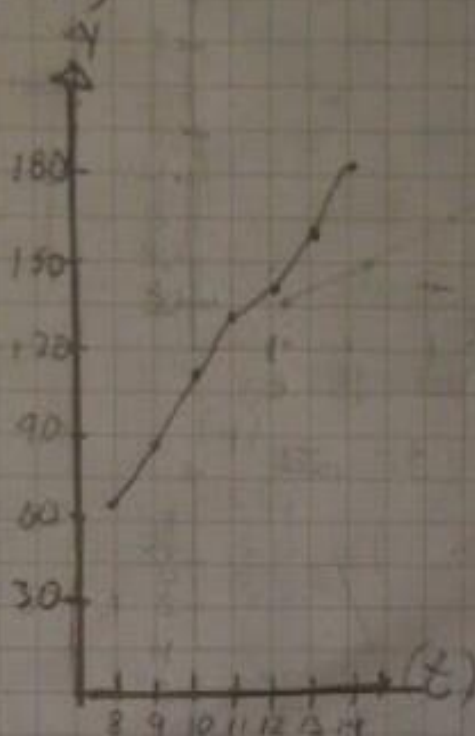VALOR DE 74000 $

$$74000 = T \cdot 3187.5 + 42000$$

$$10.039 = T$$

5) α)   (/) 5 inscriptos   (y) facturación

b) Grafica 1:   b ≈ -10,78

$64,2 = m(8) + b$
$180,4 = m(14) + b$
$116,2 = m \cdot 6$
$m = 19,37$

Grafica 2:   b = 24,47

$39,43 = m(8) + b$
$50,44 = (m(14)) + b$
$m = 1,8683$
$m = 1,81$

Grafica 1

x	1	2	3	4	5	6	7	8	9	10	11	12	13	14
y	-14,52	-23	-32,4	-13,4	9,08	25,6	44,8	64,9	85,6	103,9	123	149	167	169,4

G гarica (1)

G гarica 2

x	1	2	3	4	5	6	7	8	9	0	11	12	13	
y	26 33	28 21	30 23	31 15	33 23	37 64	37 63	39 5	41 3	43 18	45 44	46 5	48 5	

c)
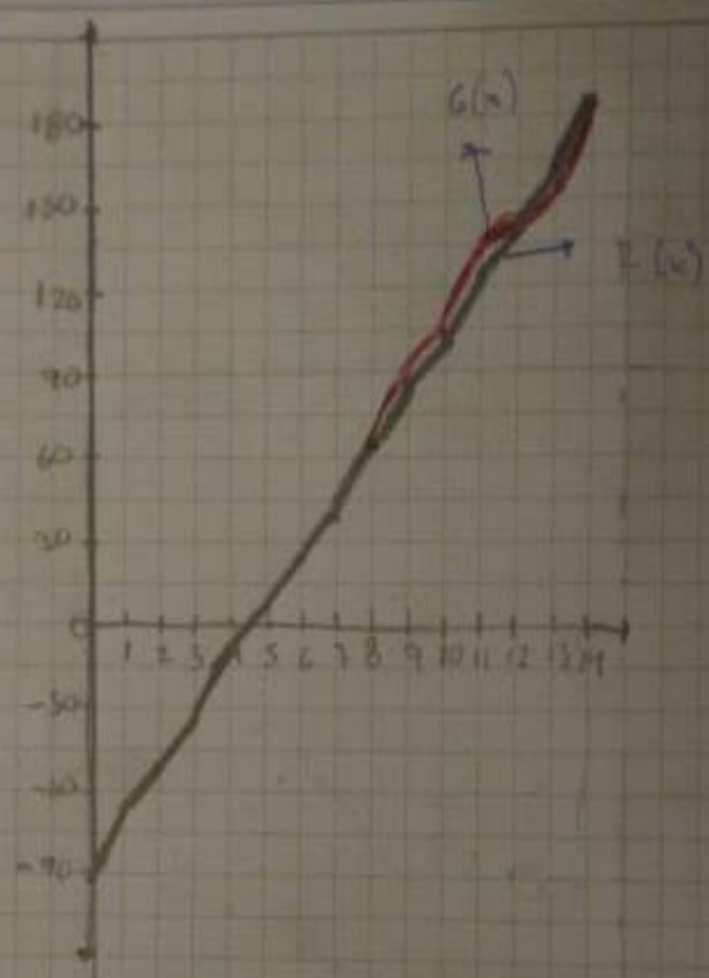
F(x)→ Puntos negros gráfica lineal
G(x)=Puntos rojos diagrama de dispersión
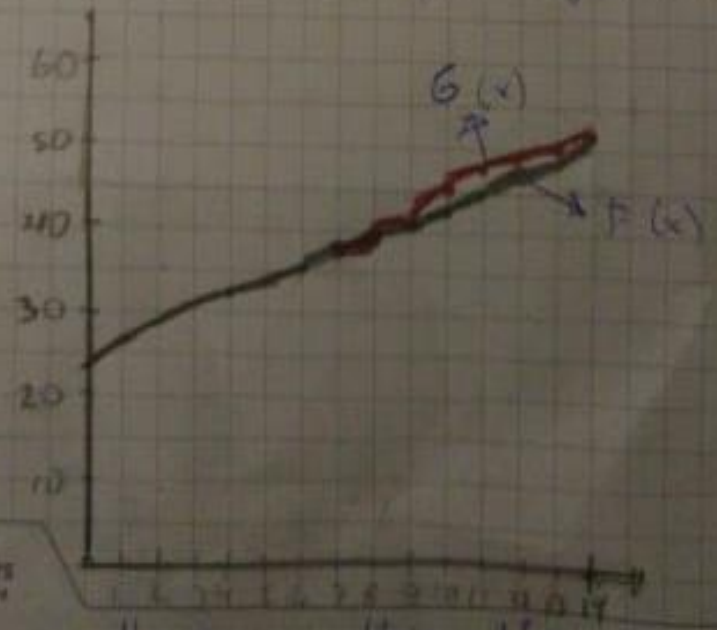
No parece ajustarse bien

D.-) Por que los misioneros hacen que los
datos sean diferentes, puesto que son diferentes
ya que uno calcula y el otro son datos estimados.
Sí se puede suponer un aproximado mayor
que su sola involucrara el total de
suscriptores entre la subtarticion o mejor dicho
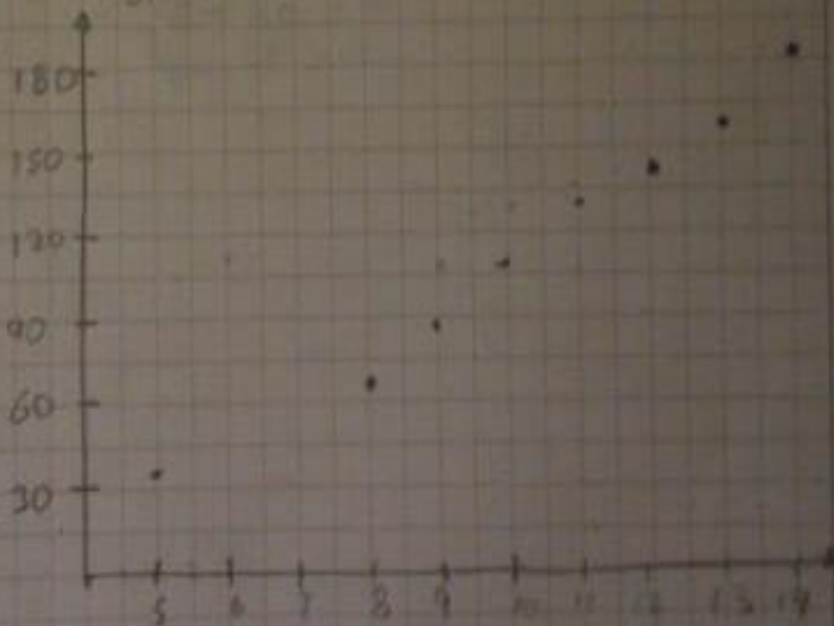a mayores suscriptores mayor es la subtarticion

e).

Gráfica 1
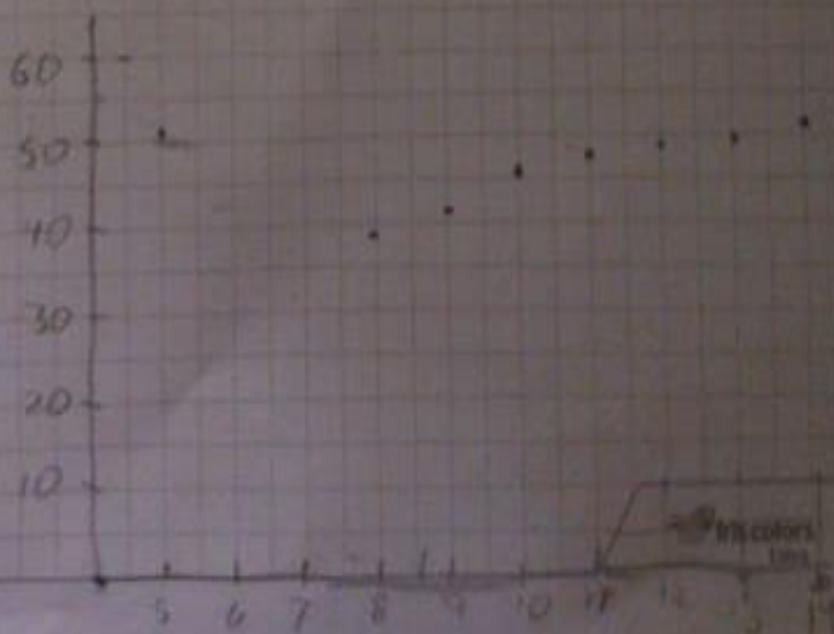

Gráfica 2

6)

$$36 + 11(m-3) \leq 200$$

$$36 + 11m - 33 \leq 200$$

$$11m \leq 203$$

$$m \leq 18,\overline{45}$$

$$m = 18 - 3$$

$$m = 15 \quad \cancel{/}$$

7) a)

$$x - y = 8 \quad I$$

$$x + 2 = 3y \quad II$$

$$x = 3y - 2$$

Reemplazando en la
primera ecuación

$$3y - 2 - y = 8$$

$$2y - 2 = 8$$

$$y = 5$$

$$x = 13 \quad \cancel{/}$$

b)

$$\cancel{x^2 - 2y^2 = 121} = 120$$

$$\cancel{(x+y)(x-y) = 11^2}$$

$$x^2 - (x-1)^2 = 11^2$$

$$\cancel{x^2} - \cancel{x^2} + 2x + 1 = 121$$

$$2x - 1 = 121$$

$$x = 62 \quad y \quad 61 \cancel{/}$$

⑧

P   2P

$4x$ | $2x+8$

x | $x+24$

$4x + x + 24 = 3x + 48$

$5x + 24 = 3x + 48$

$x = 12$ y 48

⑨

$2x + y = 55$ I

$x + y = 35$ II

Multiplicando por -1 a la ecuación II

$2x + y = 55$

$-x - y = -35$

$x = 20; y = 15$

Hay 20 chicas y 15 chicos

⑩

$\overline{ab}$
↓

$a + b = 15$

$((10a+b)/4) + 45 = \overline{ba}$

$(10a+b)/4 + 45 = 10b + a$

$10a + b/4 = 10b + a$

$10a + b = 40b + 4a - 180$

$180 = 39b - 6a$

$90 = 6b + 6a$

$270 = 45b$

$b = 6$ y $a = 9$