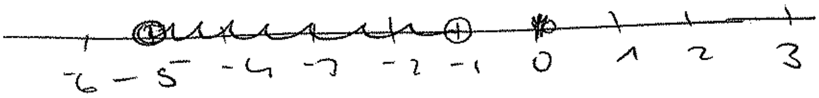
1) a) TEÓRICO b) TEÓRICO

c) $A = [-5, -1)$ $B = (-5, 1)$

$\underline{\underline{A \cap B = (-5, -1)}}$



2) a) $(27 + 2 - 6\sqrt{6}) - (8 + 3 - 4\sqrt{6}) + 2\sqrt{6} - 3\sqrt{6} =$

$= 27 + 2 - 6\sqrt{6} - 8 - 3 + 4\sqrt{6} + 2\sqrt{6} - 3\sqrt{6} = \underline{\underline{18 - 3\sqrt{6}}}$

b) $\frac{\sqrt{5}}{\sqrt{5}-2} = \frac{\sqrt{5}(\sqrt{5}+2)}{(\sqrt{5}-2)(\sqrt{5}+2)} = \frac{5+2\sqrt{5}}{1}$

$\frac{3}{\sqrt{20}+\sqrt{45}} = \frac{3}{2\sqrt{5}+3\sqrt{5}} = \frac{3}{5\sqrt{5}} = \frac{3\sqrt{5}}{25}$

$\frac{5+2\sqrt{5}}{1} + \frac{3\sqrt{5}}{25} = \frac{125+50\sqrt{5}+3\sqrt{5}}{25} = \frac{125+53\sqrt{5}}{25}$ //

3) a)

$$\begin{array}{r|cccc} & 2 & 3 & -m & 3 \\ \sqrt{3} & & 2\sqrt{3} & 3\sqrt{3}+6 & 9+6\sqrt{3}-m\sqrt{3} \\ \hline & 2 & 3+2\sqrt{3} & 3\sqrt{3}+6-m & \boxed{12+6\sqrt{3}-m\sqrt{3}} \end{array}$$

$12+6\sqrt{3}-m\sqrt{3} = 0$; $\boxed{m = \frac{12+6\sqrt{3}}{\sqrt{3}}}$

$\frac{12\sqrt{3}+18}{3}$

$\boxed{4\sqrt{3}+6}$

$$\begin{array}{r|cccc} & 2 & 3 & -m & 3 \\ -1/2 & & -1 & -1 & \frac{m}{2}+\frac{1}{2} \\ \hline & 2 & 2 & -m-1 & \boxed{\frac{m}{2}+\frac{7}{2}} \end{array}$$

$\frac{m}{2} + \frac{7}{2} = 0$; $\boxed{m = -7}$

4)

$$\begin{array}{c|cccccc}
 & 3 & -20 & 42 & -27 & 4 & -12 \\
2 & & 6 & -28 & 28 & 2 & 12 \\
\hline
 & 3 & -14 & 14 & 1 & 6 & \boxed{0} \\
2 & & 6 & -16 & -4 & -6 & \\
\hline
 & 3 & -8 & -2 & -3 & \boxed{0} & \\
3 & & 9 & 3 & 3 & & \\
\hline
 & 3 & 1 & 1 & \boxed{0} & &
\end{array}$$

$3x^2+x+1=0 \rightarrow x = \frac{-1 \pm \sqrt{1-12}}{6} \rightarrow \nexists$ sol

$$\boxed{P(x) = (x-2)^2(x-3)(3x^2+x+1)}$$

5)

$$\frac{2(x+2)(x-2)}{(x-2)(x-4)} : \frac{x(x-1)(x-4)}{x^2(x-2)} =$$

$$= \frac{2(x+2)\cancel{(x-2)}\cancel{x^2}^{x}(x-2)}{\cancel{(x-2)}(x-4)\cancel{x}(x-1)(x-4)} =$$

$$= \boxed{\frac{2x(x+2)(x-2)}{(x-4)^2(x-1)}}$$

1) a) $\frac{4\sqrt{2}-\sqrt{2}}{2\sqrt{3}-3} - \frac{2\sqrt{2}}{2\sqrt{3}} = \frac{3\sqrt{2}}{2\sqrt{3}-3} - \frac{\sqrt{2}}{\sqrt{3}} =$

$= \frac{3\sqrt{2}(2\sqrt{3}+3)}{(2\sqrt{3}-3)(2\sqrt{3}+3)} - \frac{\sqrt{2}\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{3\sqrt{2}(2\sqrt{3}+3)}{3} - \frac{\sqrt{2}\sqrt{3}}{3} =$

$= \frac{6\sqrt{6}+9\sqrt{2}-\sqrt{6}}{3} = \frac{5\sqrt{6}+9\sqrt{2}}{3}$ //

b)

$$\begin{array}{c|cccc} & 1 & -1 & 0 & -4 \\ 2 & & 2 & 2 & 4 \\ \hline & 1 & 1 & 2 & \boxed{0} \end{array}$$

$(x-2)(x^2+x+2)$

$$\begin{array}{c|ccccc} & 1 & 2 & -3 & -4 & -12 \\ 2 & & 2 & 8 & 10 & 12 \\ \hline & 1 & 4 & 5 & 6 & \boxed{0} \\ -3 & & -3 & -3 & -6 & \\ \hline & 1 & 1 & 2 & \boxed{0} & \end{array}$$

$(x-2)(x+3)(x^2+x+2)$

$\frac{(\cancel{x-2})(\cancel{x^2+x+2})}{(\cancel{x-2})(x+3)(\cancel{x^2+x+2})} = \frac{1}{x+3}$ //

2) a) i) TEÓRICO

ii) $p(-1) = (-1)^{40} - 3(-1)^{15} - 2 = 1 + 3 - 2 = 2$ //

b) i)

$$\begin{array}{c|ccccc} & 4 & 24 & 31 & m & -8 \\ -1/2 & & -2 & -11 & -10 & -\frac{m}{2}+5 \\ \hline & 4 & 22 & 20 & m-10 & \boxed{-\frac{m}{2}-3} \end{array}$$

$-\frac{m}{2} - 3 = 0$; $-m - 6 = 0$; $\boxed{m = -6}$

ii)

$$\begin{array}{c|ccccc}
 & 4 & 24 & 31 & -6 & -8 \\
\boxed{-1/2} & & -2 & -11 & -10 & 8 \\
\hline
 & 4 & 22 & 20 & -16 & \lfloor 0 \\
\boxed{-4} & & -16 & -24 & 16 & \\
\hline
 & 4 & 6 & -4 & \lfloor 0 &
\end{array}$$

$4x^2+6x-4=0$; $x=\frac{-6\pm\sqrt{36+64}}{8}=\frac{-6\pm10}{8}=$ $\boxed{1/2}$, $\boxed{-2}$

3) a) $x^4-3x^2+2x^2-6+x^4+x^2=4x^2+16-6$

$2x^4-4x^2-16=0$. $x^4-2x^2-8=0$

$x^2=t$; $t^2-2t-8=0$; $t=\frac{2\pm\sqrt{4+32}}{2}=\frac{2\pm6}{2}=$ 4 , -2

$x=\pm\sqrt{4}\rightarrow 2$ //, $\rightarrow -2$ // $x=\pm\sqrt{-2}\rightarrow\nexists$ sol

b) $\sqrt{5-2x}=2x-3$; $5-2x=4x^2+9-12x$

$0=4x^2-10x+4$; $2x^2-5x+2=0$

$x=\frac{5\pm\sqrt{25-16}}{4}=\frac{5\pm3}{4}=$ $2\rightarrow$ sí , $\cancel{1/2}\rightarrow$ no

4) Películas → x (45€)
Discos → y (72€)
Libros → z (36€)

$$\left.\begin{array}{l} 45x + 72y + 36z = 6300 \\ x = \frac{x+y+z}{2} \\ 72y = 45x + 180 \end{array}\right\}$$

$$\left.\begin{array}{l} 45x + 72y + 36z = 6300 \\ x - y - z = 0 \\ -45x + 72y = 180 \end{array}\right\} \left(\begin{array}{ccc|c} 45 & 72 & 36 & 6300 \\ 1 & -1 & -1 & 0 \\ -45 & 72 & 0 & 180 \end{array}\right)$$

$$\sim \left(\begin{array}{ccc|c} 45 & 72 & 36 & 6300 \\ 0 & 117 & 81 & 6300 \\ 0 & 144 & 36 & 6480 \end{array}\right) \sim \left(\begin{array}{ccc|c} 45 & 72 & 36 & 6300 \\ 0 & 117 & 81 & 6300 \\ 0 & 0 & 7452 & 149040 \end{array}\right)$$

$$\left.\begin{array}{r} 45x + 72y + 36z = 6300 \\ 117y + 81z = 6300 \\ 7452z = 149040 \end{array}\right\} \rightarrow \left\{\begin{array}{l} 45x + 2880 + 720 = 6300 ;\ x = 60 \,// \\ 117y = 6300 - 1620 \Rightarrow y = \frac{4680}{117} = 40 \,/ \\ z = \frac{149040}{7452} = 20 \,// \end{array}\right.$$

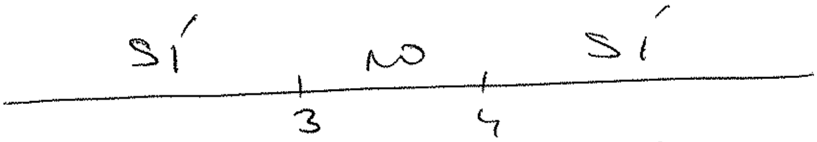
$(60, 40, 20)$

5) $\frac{x-6}{x-4} - 3 \leq 0$; $\frac{x-6}{x-4} - \frac{3x-12}{x-4} \leq 0$

$\frac{x-6-3x+12}{x-4} \leq 0$; $\boxed{\frac{-2x+6}{x-4} \leq 0}$

$-2x+6 = 0 \rightarrow x = 3 //$

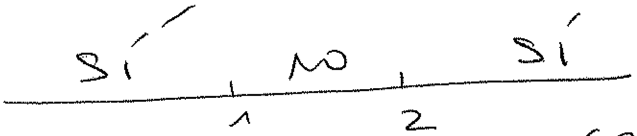
$x - 4 = 0 \rightarrow x = 4 //$



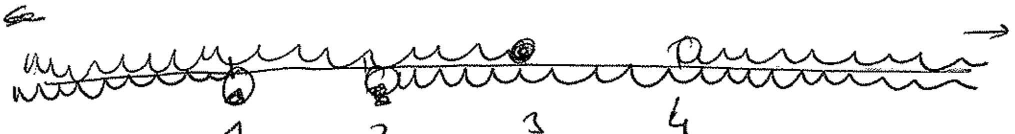
$S_1 : (-\infty, 3] \cup (4, +\infty)$

$\overline{x^2} + \overline{4} - \overline{4}x + \overline{2}x - 2 - \overline{x} > 0$; $x^2 - 3x + 2 > 0$

$x^2 - 3x + 2 = 0 < \begin{array}{l} 1 \\ 2 \end{array}$



$S_2 = (-\infty, 1) \cup (2, +\infty)$



$S = (-\infty, 1) \cup (2, 3] \cup (4, +\infty)$

1)

a) $$\frac{(2-\sqrt{3})(\sqrt{3}-1)}{(\sqrt{3}+1)\ (\sqrt{3}-1)} - \frac{1\ \sqrt{3}}{2\sqrt{3}\sqrt{3}} = \frac{2\sqrt{3}-2-3+\sqrt{3}}{2} - \frac{\sqrt{3}}{6} =$$

$$= \frac{3\sqrt{3}-5}{2} - \frac{\sqrt{3}}{6} = \frac{9\sqrt{3}-15-\sqrt{3}}{6} = \frac{8\sqrt{3}-15}{6} \ //$$

b) $$\frac{2(x^2+2x-3)}{(x\ [illegible]\ 2)} \cdot \frac{x^2-4x+4}{x^2-9} = \frac{2(x-1)(x+3)}{(x-2)} \cdot \frac{(x-2)^2}{(x+3)(x-3)} =$$

$$= \frac{2(x-1)\cancel{(x+3)}(x-2)^{\cancel{2}}}{\cancel{(x-2)}\cancel{(x+3)}(x-3)} = \frac{2(x-1)(x-2)}{(x-3)} \ //$$

2)
$$\begin{array}{r|rrrrr} & -1 & 0 & m & 0 & 1 \\ -2 & & 2 & -4 & -2m+8 & 4m-16 \\ \hline & -1 & 2 & m-4 & -2m+8 & \boxed{4m-15} \end{array}$$

$4m-15=1$

$4m=16$

$m=\frac{16}{4}=4 \ //$

$-x^4+4x^2+1=0$; $\quad x^4-4x^2-1=0 \quad x^2=t$

$t^2-4t-1=0$; $\quad t=\frac{4\pm\sqrt{16+4}}{2}=\frac{4\pm\sqrt{20}}{2}= \begin{cases} 2+\sqrt{5} \\ 2-\sqrt{5} \end{cases}$

No le tiene

$t=\pm\sqrt{2+\sqrt{5}} \quad t=\pm\sqrt{2-\sqrt{5}} \rightarrow \nexists \in \mathbb{R}$

3) a) $x^3-5x^2=\cancel{x^2}+1+2x-\cancel{x^2}-11$

x^3-5x^2 [illegible] $2x+10=0$

$$\begin{array}{r|rrrr} & 1 & -5 & -2 & 10 \\ 5 & & 5 & 0 & -10 \\ \hline & 1 & 0 & -2 & \boxed{0} \end{array}$$

$x^2-2=0$

$x^2=2$

$x=\pm\sqrt{2}$

Sol: 5, $\sqrt{2}$, $-\sqrt{2}$

b) $\sqrt{2x-1} = x-2$; $2x-1 = x^2+4-4.x$

$0 = x^2-6x+5$; $x = \frac{6\pm\sqrt{36-20}}{2} = \frac{6\pm 4}{2} = \begin{cases} 5 \rightarrow \underline{\text{sí}} \\ 1 \rightarrow \underline{\text{no}} \end{cases}$

$x=5 \rightarrow \sqrt{9}+4 = 5+2 \Rightarrow$ sí

$x=1 \rightarrow \sqrt{1}+4 = 1+2 \rightarrow$ no

4) H → x
M → y
N → z

$$x+y+z=30 \qquad x+y=2z \qquad x+3y=2z+20$$

$$\left\{\begin{array}{l} x+y+z=30 \\ x+y-2z=0 \\ x+3y-2z=20 \end{array}\right.$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 30 \\ 1 & 1 & -2 & 0 \\ 1 & 3 & -2 & 20 \end{array}\right) \sim \left(\begin{array}{ccc|c} 1 & 1 & 1 & 30 \\ 0 & 0 & 3 & 30 \\ 0 & 2 & -3 & -10 \end{array}\right) \sim \left(\begin{array}{ccc|c} 1 & 1 & 1 & 30 \\ 0 & 2 & -3 & -10 \\ 0 & 0 & 3 & 30 \end{array}\right)$$

$$\left.\begin{array}{l} x+y+z=30 \\ 2y-3z=-10 \\ 3z=30 \end{array}\right\} \quad \begin{array}{l} x=10 \\ 2y=-10+30=20 ; \quad y=10 \qquad \underline{(10,10,10)} \\ z=\frac{30}{3}=10 \end{array}$$

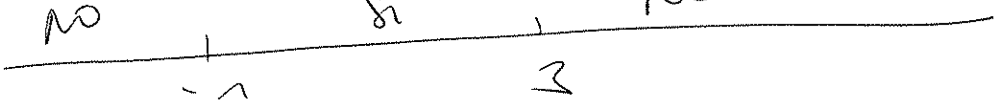
5) $\frac{5x+5}{10} - \frac{4-6x}{10} \le \frac{1+4x}{10}$; $5x+5-4+6x \le 1+4x$

$5x+6x-4x \le 1-5+4$; $7x \le 0$; $\underline{x \le 0}$

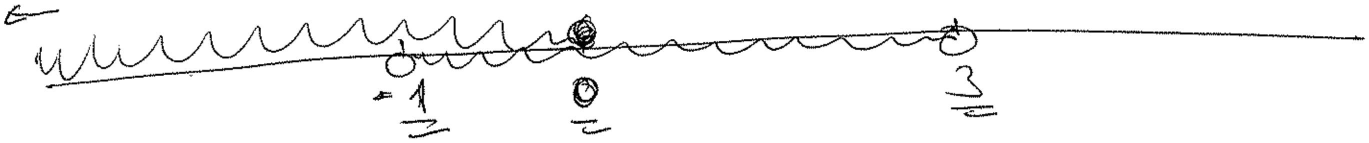
$S_1 = (-\infty, 0]$

$x^2-2x-3=0 \rightarrow -1, 3$

$x^2-2x-3<0$;



$S_2 = (-1, 3)$



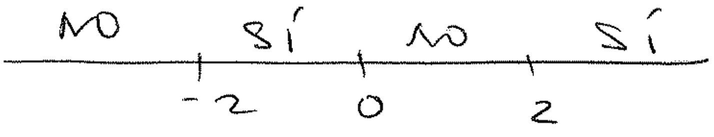
$S = S_1 \cap S_2 = (-1, 0]$ //

1) a) $x^2+x=0 \to x(x+1)=0 \begin{cases} x=0 \\ x=-1 \end{cases}$

$D_f = \mathbb{R} \setminus \{0,-1\}$ //

$D_g = \mathbb{R}$ //

$\dfrac{x^3}{x^2-4} \geq 0$



$D_h = (-2,0] \cup (2,+\infty)$ //

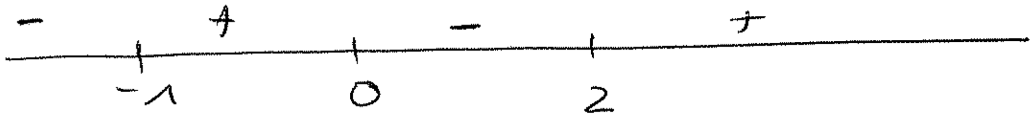
b) $\dfrac{3x-6}{x^2+x} = 3$; $3x-6 = 3x^2+3x$

$0 = 3x^2+6 \to$ No pertenece

$\dfrac{3x^2+1}{x^2+2} = 3$; $3x^2+1 = 3x^2+6 \to$ No pertenece

c) $f(x)$ — Corte eje OX → $(2,0)$

AV: $x=-1$; $x=0$



$+ : (-1,0) \cup (2,+\infty)$

$- : (-\infty,-1) \cup (0,2)$

$g(x) \to \; + : (-\infty,+\infty)$

d) $f(-x) = \dfrac{3(-x)-6}{(-x)^2 + \cancel{(-x)}} = \dfrac{-3x-6}{x^2 - x} \to$ NO TIENE

$g(-x) = \dfrac{3(-x)^2+1}{(-x)^2+2} = \dfrac{3x^2+1}{x^2+2} \to$ PAR (Respecto eje OY)

e) $f(x) \begin{cases} OX: \; 3x-6=0 \to x=2 \; \to (2,0) \\ OY: \text{ No Corte.} \end{cases}$

2) i) $f(x) = \begin{cases} -2x+1 & \text{si } x \leq -1 \\ -x^2+4 & \text{si } -1 < x \leq 2 \\ x^2-6x+8 & \text{si } x > 2 \end{cases}$

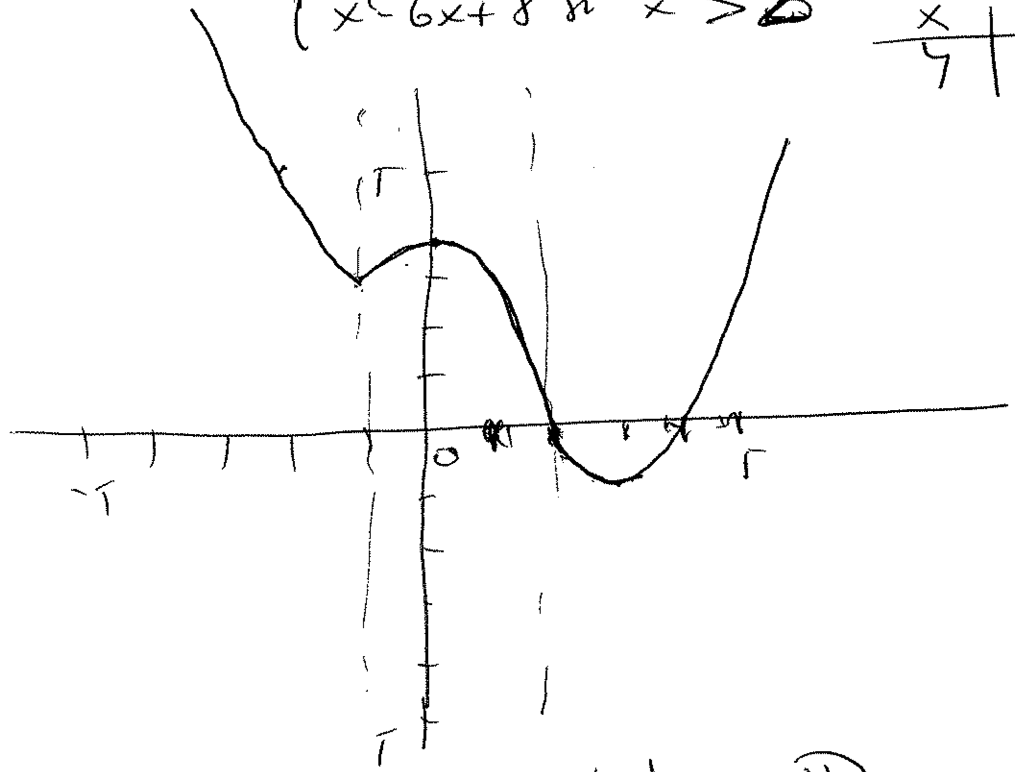
x	-2	-1
y	5	3

x	-1	2
y	3	0

V(0,4)

x	2	3
y	0	-1

V(3,-1)



ii) Continua en todo $\mathbb{R}$

iii) Creciente: $(-1,0) \cup (3,+\infty)$

Decreciente: $(-\infty,-1) \cup (0,3)$

iv) Eje OX: $x^2-6x+8=0$ $\nearrow x=2 \longrightarrow (2,0)$ $\searrow x=4 \longrightarrow (4,0)$ //

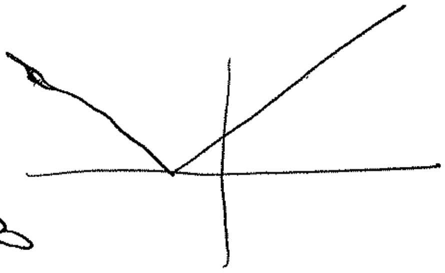
Eje OY: $-0^2+4=4 \longrightarrow (0,4)$ //

3) a) $-3x-5=0$; $-3x=5$; $x=\frac{-5}{3}$

$+ \quad | \quad -$

$-5/3$

$f(x) = \begin{cases} -3x-5 & \text{si } x < -5/3 \\ 3x+5 & \text{si } x \geq -5/3 \end{cases}$



b) Corte ejes

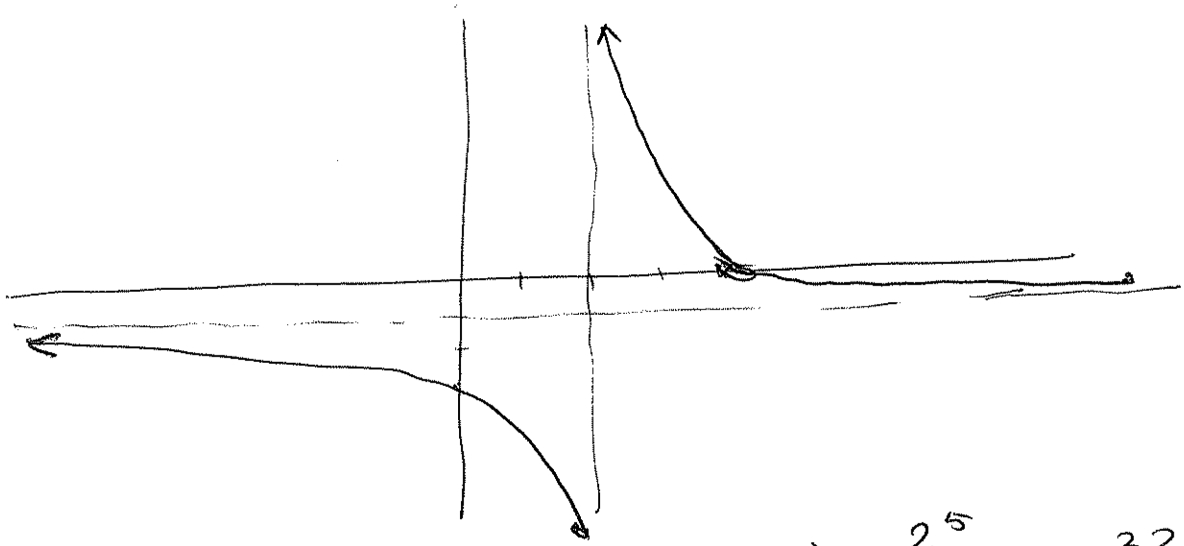
OX: $-2x+8=0 \rightarrow x=4 \rightarrow (4,0)$

OY: $\left(0, \frac{-4}{3}\right)$

Asíntotas

H: $y=-2/3$

V: $3x-6=0 \rightarrow x=2$



c)

x	-2	-1
y	$-32/3$	-8

$$g(-2)=\frac{2^5}{-2-1}=-\frac{32}{3}$$

$$g(-1)=\frac{2^4}{-1-1}=-8$$

$$m=\frac{-8+32/3}{-1+2}=\frac{8}{3}$$

$$y+8=\frac{8}{3}(x+1)\ ;\ y=\frac{8}{3}x+\frac{8}{3}-8$$

$$y=\frac{8}{3}x-\frac{16}{3}$$

$$y(-1'5)=\frac{8(-1'5)}{3}-\frac{16}{3}=\frac{-12-16}{3}=\frac{-28}{3}\ //$$

1) a) $x^2+x=0 \begin{cases} x=0 \\ x=-1 \end{cases}$ $D_f = \mathbb{R}-\{0,-1\}$

$D_g = \mathbb{R}-\{0\}$

$x-3=0 - x=3$

$x=0$

$+ \quad - \quad +$

$0 \quad 3$

$D_h = (-\infty,0)\cup[3,+\infty)$

b) $2x^2-8=0;\ 2x^2=8;\ x^2=4,\ x=\pm 2$

$x^2+x=0 - x=-1, 0$

$+ \quad - \quad + \quad - \quad +$

$-2 \quad -1 \quad 0 \quad 2$

f(x)

$+ : (-\infty,-2)\cup(-1,0)\cup(2,+\infty)$

$- : (-2,-1)\cup(0,2)$

g(x): $+ : (0,+\infty)$

$- : (-\infty,0)$

c) f(x) $\begin{cases} OX : (-2,0),(2,0) \\ OY : \text{NO CORTA} \end{cases}$

~~a~~

g(x) $\begin{cases} OX : \text{NO CORTA} \\ OY : \text{NO CORTA} \end{cases}$

h(x): $\begin{cases} OX : (3,0) \\ OY . \text{NO CORTA} \end{cases}$

d) $\frac{2x^2-8}{x^2+x}=2;\quad 2x^2-8=2x^2+2x;\quad x=-4 - \underline{(-4,2)}$

$\sqrt[3]{\frac{1}{x}}=2;\quad \frac{1}{x}=8;\quad x=\frac{1}{8};\quad \underline{\left(\frac{1}{8},2\right)}$

2) i) $f(x) = \begin{cases} 2x+6 & \text{si } x < -3 \\ x^2-2x & \text{si } -3 \leq x < 3 \\ -x^2 & \text{si } x \geq 3 \end{cases}$

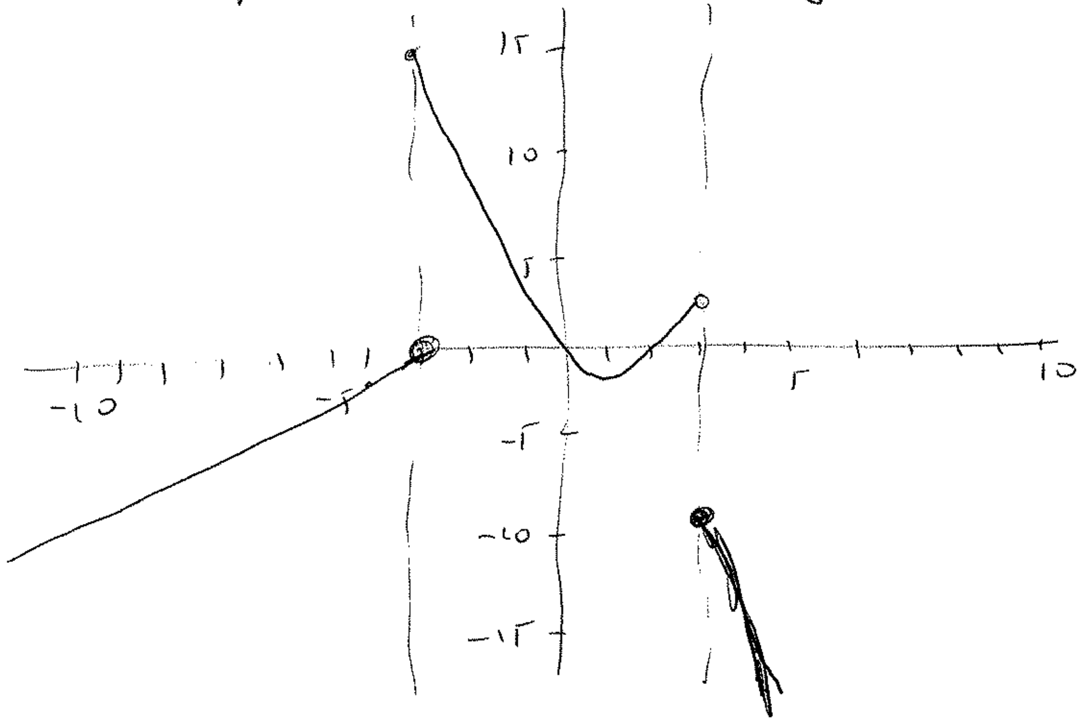
x	-4	-3
y	-2	0

x	-3	3
y	15	3

V(1, -1)

x	3	4
y	-9	-16

V(0, 0)



ii) Creciente: $(-\infty, -3) \cup (1, 3)$

Decreciente: $(-3, 1) \cup (3, +\infty)$

iii) Eje OX: $x^2-2x=0 \begin{cases} \to 0 \longrightarrow (0,0) \\ 2 \longrightarrow (2,0) \end{cases}$

Eje OY: $(0,0)$

iv) Discontinua en $x=-3$ y $x=3$

3) a) $2^x \cdot 2^3 - 3 \cdot \frac{2^x}{2^3} - 5 \cdot 2^x = 21$; $\boxed{2^x = t}$

$8t - \frac{3t}{8} - 5t = 21$; $64t - 3t - 40t = 168$

$21t = 168$; $t = \frac{168}{21} = 8$

$2^x = 8 \Rightarrow \underline{\underline{x = 3}}$

b) $\frac{3^x}{3} - 2 \cdot \frac{3^{2x}}{3} - (3^2)^x = 30$

$\boxed{3^x = t}$ $\frac{t}{3} - \frac{2t^2}{3} - \cancel{t}^2 = 30$

$t - 2t^2 - 3t^2 = 90$; $0 = 5t^2 - t + 90$

$t = \frac{1 \pm \sqrt{1-1800}}{2} \longrightarrow \nexists$ sol

c) $10 - 2x > 0$; $-2x > -10$; $x < 5$

$D = (-\infty, 5)$

Corte ejes
- OX : $10-2x=1$; $x = \frac{9}{2}$
- OY: $(0,1)$

4) a)

i) $(x^2-1)^{-1} = \frac{1}{8}$; $x^2-1=8$; $x^2=9$; $\underline{\underline{x = \pm 3}}$

ii) $5^{\frac{x+1}{2}} = 10$; $\frac{x+1}{2} = \frac{\log 10}{\log 5} = 1'43$

$x+1 = 2'86$; $\underline{\underline{x = 1'86}}$

iii) $64^{1/3} = x^2 - 3x$; $4 = x^2 - 3x$

$0 = x^2 - 3x - 4$; $x = \frac{3 \pm \sqrt{9+16}}{2} = \frac{3 \pm 5}{2}$: 4 // -1 //

b) $24000 = 8000\,(1+r)^{15}$; $3 = (1+r)^{15}$

$1+r = 1'075$; $r = 0'075 \longrightarrow \underline{\underline{r = 7'5\,\%}}$

c) $3 \log x - \frac{1}{2} \log x + \log x = 7$

$6 \log x - \log x + 2 \log x = 14$

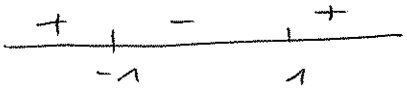
$7 \log x = 14$; $\log x = 2$; $\underline{\underline{x = 100}}$

1) a) ~~[illegible]~~ $D_f = \mathbb{R} - \{0\}$

~~[illegible]~~ $D_g = \mathbb{R} - \{-2\}$

$x^2+1=0 \rightarrow \nexists$ sol

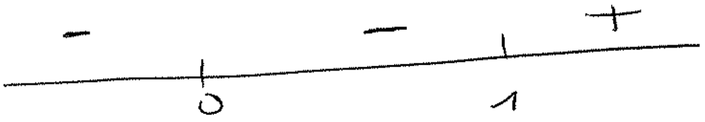
$x^2-1=0 \Rightarrow x = \begin{cases} -1 \\ 1 \end{cases}$



$D_h = (-\infty,-1) \cup (1,+\infty)$

b) $x-1=0 - x=1$ //

$x^2=0 - x=0$ //



$x^2=0 - x=0$

$x^3+8=0 - x=-2$

c) $f(x)$ — 0x: → (1, 0)
— 0y: — NO CORTA

$g(x)$ — 0x: (0,0)
— 0y: (0, 0)

$h(x)$ — 0x: NO CORTA
— 0y: NO CORTA

d) $\frac{x-1}{x^2} = \frac{x^2}{x^3+8}$; $(x-1)(x^3+8) = x^4$

$x^4+8x-x^3-8=x^4$; $0 = x^3 - 8\cancel{x} + 8$

	1	0	−8	8
②		2	4	−8
	1	2	−4	0

$x^2+2x-4=0$; $x = \frac{-2 \pm \sqrt{4+16}}{2} = \frac{-2\pm\sqrt{20}}{2} = \begin{cases} 1'23 \\ -3'23 \end{cases}$

$(2, \frac{1}{4})$ $(1'23, 0'15)$ $(-3'23, 0'40)$

2) a)

$$f(x) = \begin{cases} x^2+2x+1 & \text{si } x \leq 0 \\ -x^2+1 & \text{si } 0 < x < 2 \\ -x-1 & \text{si } x \geq 2 \end{cases}$$

x	-1	0
y	0	1

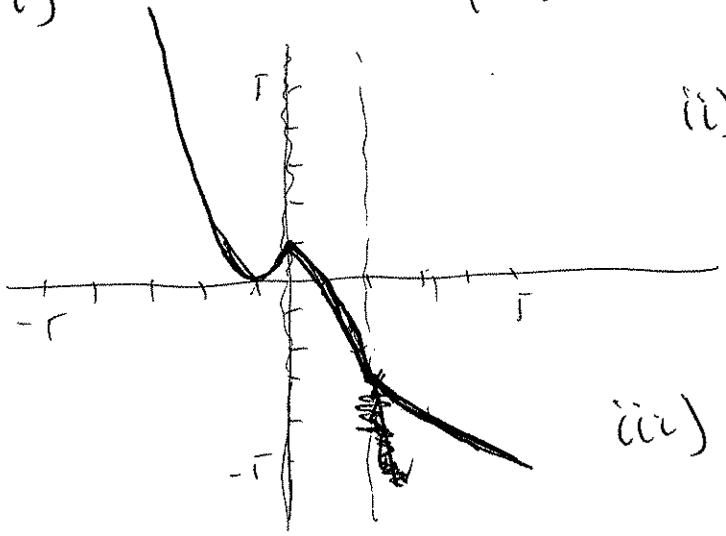
V(-1,0)

x	0	2
y	1	-3

V(0,1)

x	2	3
y	-3	-4

i)



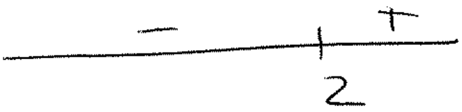
ii) Creciente : $(-1,0)$

Decreciente : $(-\infty,-1) \cup (0,+\infty)$

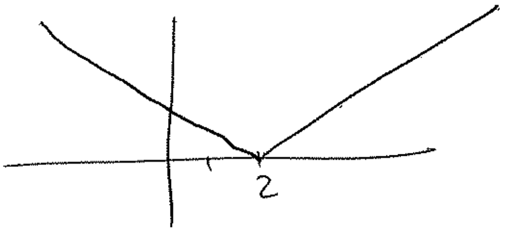
iii) OX : $(-1,0)$, $(1,0)$

OY : $(0,1)$

b) $3x-6=0$; $3x=6$; $x = \frac{6}{3} = 2$



$$g(x) = \begin{cases} -3x+6 & \text{si } x < 2 \\ 3x-6 & \text{si } x \geq 2 \end{cases}$$



$|3x-6| = 9$; $3x-6=9$; $3x=15$; $x=5$//

$3x-6=-9$ $3x=-3$; $x=-1$//

3) a)

$25 \cdot 5^x + \frac{3 \cdot 5^x}{5} - 4 \cdot 5^x = 108$; $\boxed{5^x = t}$

$25t + \frac{3t}{5} - 4t = 108$

$125t + 3t - 20t = 540$

$108t = 540$; $t = \frac{540}{108} = 5$//

$5^x = 5 \Rightarrow \boxed{x = 1}$

b) $\frac{2^{2x}}{8} - 2\cdot 2^{x} + 2\cdot 2^{2x} = 26$ $\boxed{2^x = t}$

$\frac{t^2}{8} - 2t + 2t^2 = 26$; $t^2 - 16t + 16t^2 = 208$

$17t^2 - 16t - 208 = 0$; $t = \frac{16 \pm \sqrt{256 + 14144}}{34} =$

$= \frac{16 \pm 120}{34} = \begin{cases} 4 \\ -3'05 \end{cases}$ $2^x = 4 \to \boxed{x = 2}$

$2^x = -3'05 \to \nexists$ sol

c) $5.000 = 25.000\,(0'88)^t$; $0'2 = 0'88^t$

$t = \frac{\log 0'2}{\log 0'88} = \underline{\underline{12'59 \text{ años}}}$

4) a) i) $\sqrt{x} + 2 = 4$; $\sqrt{x} = 2$; $\underline{\underline{x = 4}}$

ii) $(x^2+1)^2 = 100$; $x^4 + 1 + 2x^2 = 100$

$x^4 + 2x^2 - 99 = 0$ $\boxed{x^2 = t}$

$t^2 + 2t - 99 = 0$; $t = \frac{-2 \pm \sqrt{4 + 396}}{2} = \frac{-2 \pm 20}{2} = \begin{cases} 9 \\ -11 \end{cases}$

$t = \pm\sqrt{9} \begin{cases} 3 \\ -3 \end{cases}$ $t = \pm\sqrt{-11} \to \nexists$ sol

iii) $6 \log x - 8 \log x + 5 \log x = 3$

$3 \log x = 3$; $\log x = 1$; $\underline{\underline{x = 10}}$

b) $\log \sqrt[3]{0'225} = \log \sqrt[3]{\frac{225}{1000}} = \log \sqrt[3]{\frac{3^2 \cdot 5^2}{1000}} =$

$= \log \frac{3^{2/3} \cdot 5^{2/3}}{10^{3/3}} = \frac{2}{3} \log 3 + \frac{2}{3} \log 5 - \frac{3}{3} \log 10 =$

$= 0'313 + 0'46 - 1 = \underline{\underline{-0'23}}$

c) $f(1) = 3^1 - 1^2 = 3 - 1 = 2 \longrightarrow (1, 2)$

$f(2) = 3^2 - 2^2 = 9 - 4 = 5 \longrightarrow (2, 5)$

$m = \frac{5-2}{2-1} = \frac{3}{1} = 3$

$y - 2 = 3(x-1)$; $\underline{\underline{y = 3x - 1}}$

$y(1'8) = 3 \cdot 1'8 - 1 = 5'4 - 1 = \underline{\underline{4'4}}$

1) i) $x^3-8=0$

$$\begin{array}{c|cccc} & 1 & 0 & 0 & -8 \\ 2 & & 2 & 4 & 8 \\ \hline & 1 & 2 & 4 & \boxed{0} \end{array}$$

$x^2-3x+2=0 \to x=1$

$\qquad\qquad\quad \to x=2$

$$\lim_{x\to 2} \frac{\cancel{(x-2)}(x^2+2x+4)}{\cancel{(x-2)}\;(x-1)} = \frac{4+4+4}{2-1} = 12 //$$

ii) $\left(\frac{2}{3}\right)^{+\infty} = 0 //$

iii) $$\lim_{x\to+\infty} \frac{\left(\sqrt{9x^4-x^2+x}-\sqrt{9x^4-2x^2-x}\right)\left(\sqrt{9x^4-x^2+x}+\sqrt{9x^4-2x^2-x}\right)}{\sqrt{9x^4-x^2+x}+\sqrt{9x^4-2x^2-x}} =$$

$$= \lim_{x\to+\infty} \frac{(\cancel{9x^4}-x^2+x)-(\cancel{9x^4}-2x^2-x)}{\sqrt{9x^4-x^2+x}+\sqrt{9x^4-2x^2-x}} = \lim_{x\to+\infty} \frac{x^2+2x}{3x^2+3x^2} = \underline{\underline{\frac{1}{6}}}$$

iv) $$\lim_{x\to 1} \left(\frac{(x^2-2x)(x^2-1)-x^3(x-1)}{(x-1)(x^2-1)} \right) =$$

$$= \lim_{x\to 1} \left(\frac{\cancel{x^4}-x^2-2x^3+2x-\cancel{x^4}+x^3}{(x-1)(x^2-1)} \right) =$$

$$= \lim_{x\to 1} \frac{-x^3-x^2+2x}{(x-1)(x^2-1)} = \lim_{x\to 1} \frac{-x(x^2+x-2)}{(x-1)(x^2-1)} =$$

$$= \lim_{x\to 1} \frac{-x\,\cancel{(x-1)}(x+2)}{(x-1)^2(x+1)} = \frac{-3}{0} = \infty$$

v) $$\lim_{x\to -2} \frac{(\sqrt{5-2x}-3)(\sqrt{5-2x}+3)}{(2x^2+5x+2)(\sqrt{5-2x}+3)} =$$

$$= \lim_{x\to -2} \frac{5-2x-9}{(2x^2+5x+2)(\sqrt{5-2x}+3)} = \lim_{x\to -2} \frac{-\cancel{2}(x\cancel{+2})}{\cancel{2}(x\cancel{+2})(x+1/2)(\sqrt{5-2x}+3)} =$$

$$2x^2+5x+2=0; \quad x = \frac{-5\pm\sqrt{25-16}}{4} = \frac{-5\pm 3}{4} = \begin{cases} -1/2 \\ -2 \end{cases}$$

$$= \lim_{x\to -2} \frac{-1}{(x+1/2)(\sqrt{5-2x}+3)} = \frac{-1}{-\frac{3}{2}\cdot 6} = \frac{-1}{-9} = \frac{1}{9} //$$

2) FUNCIONES: Nada CONEXIONES: $\boxed{x=4}$

$$\lim_{x\to 4^-} \frac{x^2-16}{x-4} = \lim_{x\to 4^-} \frac{(x+4)\cancel{(x-4)}}{\cancel{(x-4)}} = 8$$

$$\lim_{x\to 4^+} \frac{x^2-16}{x-4} = \lim_{x\to 4^+} \frac{(x+4)\cancel{(x-4)}}{\cancel{(x-4)}} = 8$$

$f(4) = 6$ D.E

3) a) $$\lim_{x\to -2^-} f(x) = (-2)^2-4 = 4-4 = 0 //$$

$$\lim_{x\to -2^+} f(x) = \frac{(-2)^2+k}{(-2)^2-1} = \frac{4+k}{3}$$

$$f(-2) = 0$$

$$\frac{4+k}{3} = 0 \Rightarrow \boxed{k=-4}$$

b) Funcions: $\boxed{x=-1}$

Conexions: $\boxed{x=-2}$ $\boxed{x=1}$

$\lim_{x\to -2^-} f(x) = 0$

$\lim_{x\to -2^+} f(x) = 0 \Rightarrow$ CONTINUA

$f(-2) = 0$

$\lim_{x\to -1^-} f(x) = -\infty$

$\lim_{x\to -1^+} f(x) = +\infty \Rightarrow$ D.I.S.I

$f(-1) = \nexists$

$\lim_{x\to 1^-} f(x) = +\infty$

$\lim_{x\to 1^+} f(x) = 3 \Rightarrow$ D.I.S.I

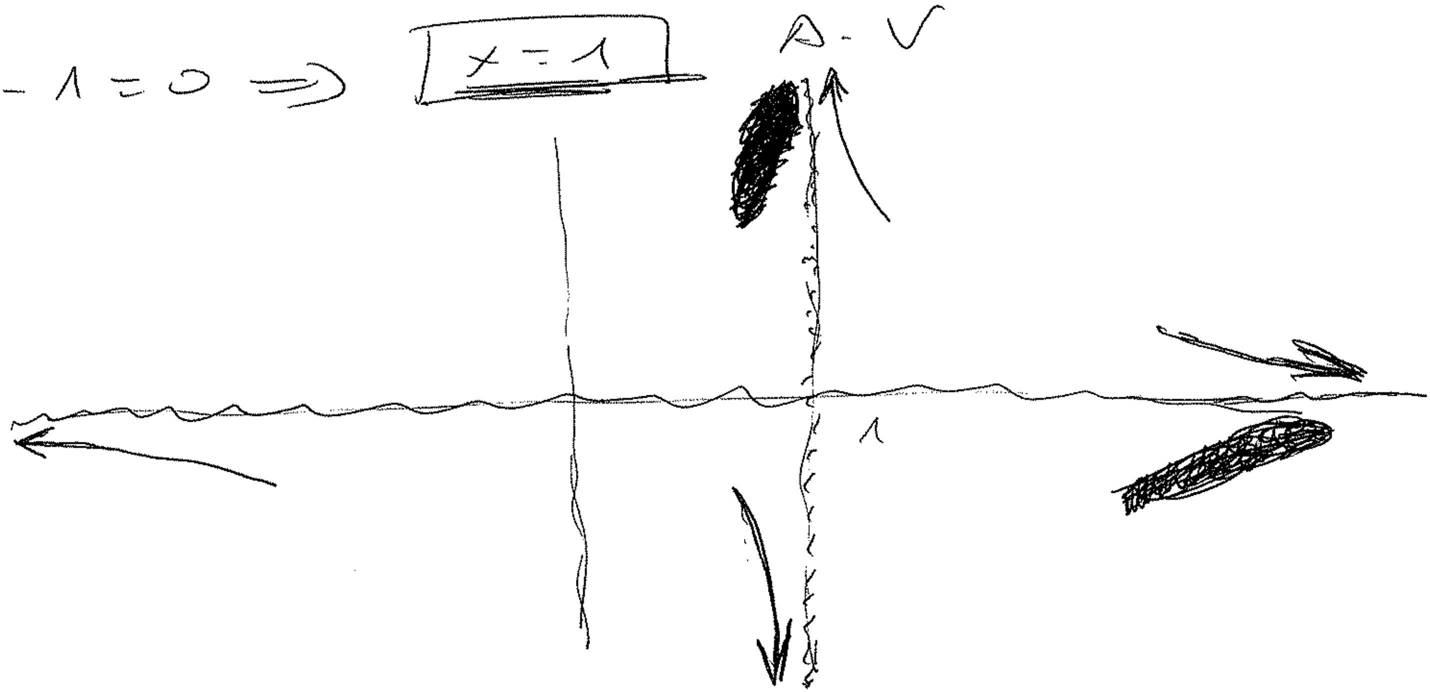
$f(1) = 3$

4) a) TEÓRICO

b) $\lim_{x\to +\infty} f(x) = 0$; $\lim_{x\to -\infty} f(x) = 0$

$\boxed{y=0}$ A.H (Dos lados)

$x^3 - 1 = 0 \Rightarrow \boxed{x=1}$ A.V



1) $\lim\limits_{x \to 0^-} f(x) = a$ $\qquad \underline{\underline{a = 0}}$

$\lim\limits_{x \to 0^+} f(x) = 0$

$f(0) = a$

FUNCIONES $\quad x^2 - 3x + 2 = 0 \begin{cases} x = 1 // \\ x = 2 // \end{cases} \qquad x - 3 = 0 \to x = 3 //$

CONEXIONES $\quad x = 0 // \qquad x = 2 //$

x = 0 $\quad \lim\limits_{x \to 0^-} f(x) = 0 \,/\, \lim\limits_{x \to 0^+} f(x) = 0 \,/\, f(0) = 0$

CONTINUA

x = 1 $\quad \lim\limits_{x \to 1^-} f(x) = -\infty \,,\, \lim\limits_{x \to 1^+} f(x) = +\infty \qquad f(1) = \nexists$

D.I.S.I

x = 2 $\quad \lim\limits_{x \to 2^-} f(x) = \lim\limits_{x \to 2^-} \frac{x\cancel{(x-3)}}{(x-1)\cancel{(x-3)}} = \frac{2}{1} = 2$

$\lim\limits_{x \to 2^+} f(x) = \frac{4}{2-3} = \frac{4}{-1} = -4$

$f(2) = \frac{4}{2-3} = -4$

D.I.S.F

x = 3 $\quad \lim\limits_{x \to 3^-} f(x) = -\infty \,,\, \lim\limits_{x \to 3^+} f(x) = +\infty \,/\, f(3) = \nexists$

D.I.S.I

2)

i) $\lim\limits_{x \to 1} \frac{(\sqrt{x^2+3} - 2)(\sqrt{x^2+3} + 2)}{(x^2+x-2)(\sqrt{x^2+3} + 2)} =$

$= \lim\limits_{x \to 1} \frac{x^2+3-4}{(x^2+x-2)(\sqrt{x^2+3} + 2)} = \lim\limits_{x \to 1} \frac{(x+1)\cancel{(x-1)}}{\cancel{(x-1)}(x+2)(\sqrt{x^2+3} + 2)} =$

$= \lim\limits_{x \to 1} \frac{x+1}{(x+2)(\sqrt{x^2+3} + 2)} = \frac{1+1}{(1+2)(2+2)} = \frac{2}{12} = \frac{1}{6} //$

ii) $\lim_{x \to -1} \frac{x^2(x+\cancel{1})}{2\cancel{(x+1)}(x-\frac{3}{2})} = \frac{(-1)^2}{2(-1-\frac{3}{2})} = \frac{-1}{5}$ //

iii) $\lim_{x \to +\infty} \left(\frac{(x^2-4)(x^2-2) - x^3 \cdot x}{x(x^2-2)} \right) =$

$= \lim_{x \to +\infty} \left(\frac{\cancel{x^4} - 2x^2 - 4x^2 + 8 - \cancel{x^4}}{x^3 - 2x} \right) = \lim_{x \to +\infty} \frac{-6x^2+8}{x^3-2x} = 0$ //

3) a) $f(4) = \sqrt{\frac{4}{4+5}} = \sqrt{\frac{4}{9}} = \frac{2}{3}$ $\quad P_0(4, 2/3)$

$f'(x) = \frac{1}{2\sqrt{\frac{x}{x+5}}} \cdot \frac{1(x+5) - 1.x}{(x+5)^2} = \frac{1}{2\sqrt{\frac{x}{x+5}}} \cdot \frac{5}{(x+5)^2} =$

$= \frac{5}{2\sqrt{\frac{x}{x+5}}\,(x+5)^2} = \frac{5}{2 . \frac{2}{3} . 81} = \frac{5}{108}$

$\boxed{y - \frac{2}{3} = \frac{5}{108}(x-4)}$

b) i) $f(1) = 2$; $f'(-1) = 0$; $f'(x) = 3ax^2 - 8x + 4$

$a(+1)^3 - 4(+1)^2 + 4(+1) + b = 2$

$3a(-1)^2 - 8(-1) + 4 = 0$

$\begin{cases} +a - 4 + 4 + b = 2 \\ 3a + 8 + 4 = 0 \end{cases}$

$\begin{cases} +a + b = 2 \\ 3a = -12 \end{cases}$ $\quad a = -\frac{12}{3} = -4$

$-4 + b = 2 \Rightarrow b = 2 + 4 = 6$

$\boxed{\begin{matrix} a = -4 \\ b = 6 \end{matrix}}$

ii) $f(x) = -4x^3 - 4x^2 + 4x + 6$

$f'(x) = -12x^2 - 8x + 4$

$f''(x) = -24x - 8$

$-12x^2 - 8x + 4 = 0$; $3x^2 + 2x - 1 = 0$

$$x = \frac{-2 \pm \sqrt{4+12}}{6} = \frac{-2 \pm 4}{6} = \left\langle \begin{matrix} 1/3 \\ -1 \end{matrix} \right.$$

$f(-1) = -4(-1)^3 - 4(-1)^2 + 4(-1) + 6 = 4 - 4 - 4 + 6 = 2$

$$f\left(\frac{1}{3}\right) = -4 \cdot \frac{1}{27} - 4 \cdot \frac{1}{9} + 4 \cdot \frac{1}{3} + 6 = \frac{-4}{27} - \frac{4}{9} + \frac{4}{3} + 6 =$$

$$= \frac{-4 - 12 + 36 + 162}{27} = \frac{182}{27}$$

$E_1\ (-1, 2) \rightarrow$ Min relat

$E_2\ \left(\frac{1}{3}, \frac{182}{27}\right) \rightarrow$ Máx relat

6'74

~~$f'(-1) = -12(-1)^2 - 8(-1) + 4 = -12 + 8 + 4 = 0$~~

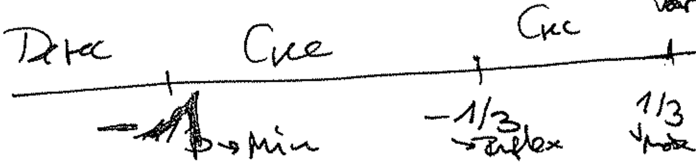
$f''(-1) = -24 \cdot (-1) - 8 = 24 - 8 = 16 > 0$

$f''(1/3) = -24 \cdot 1/3 - 8 = -8 - 8 = -16 < 0$

$-24x - 8 = 0$, $-24x = 8$, $x = -\frac{8}{24} = -\frac{1}{3}$

$I_1\ \left(-\frac{1}{3}, \frac{118}{27}\right) \rightarrow$ Inflex

4'37



$$f\left(-\frac{1}{3}\right) = -4 \cdot \left(\frac{-1}{27}\right) - 4 \cdot \frac{1}{9} + 4 \cdot \left(\frac{-1}{3}\right) + 6 = \frac{4}{27} - \frac{4}{9} - \frac{4}{3} + 6 =$$

$$= \frac{4 - 12 - 36 + 162}{27} = \frac{118}{27}$$

4) * $D = \mathbb{R} - \{-3, 3\}$

* Cortes $\nearrow$ OX: $(0, 0)$
  $\searrow$ OY: $(0, 0)$

* Asíntotas $\nearrow$ H: $\boxed{y = 2}$
  $\searrow$ V: $\boxed{x = -3}$ Dos Casos $\boxed{x = 3}$

$\lim_{x \to -3^-} f(x) = +\infty$ $\lim_{x \to 3^-} f(x) = -\infty$

$\lim_{x \to -3^+} f(x) = -\infty$ $\lim_{x \to 3^+} f(x) = +\infty$

* Ext. relat: $f'(x) = \dfrac{4x(x^2-9) - 2x \cdot 2x^2}{(x^2-9)^2} = \dfrac{-36x}{(x^2-9)^2}$

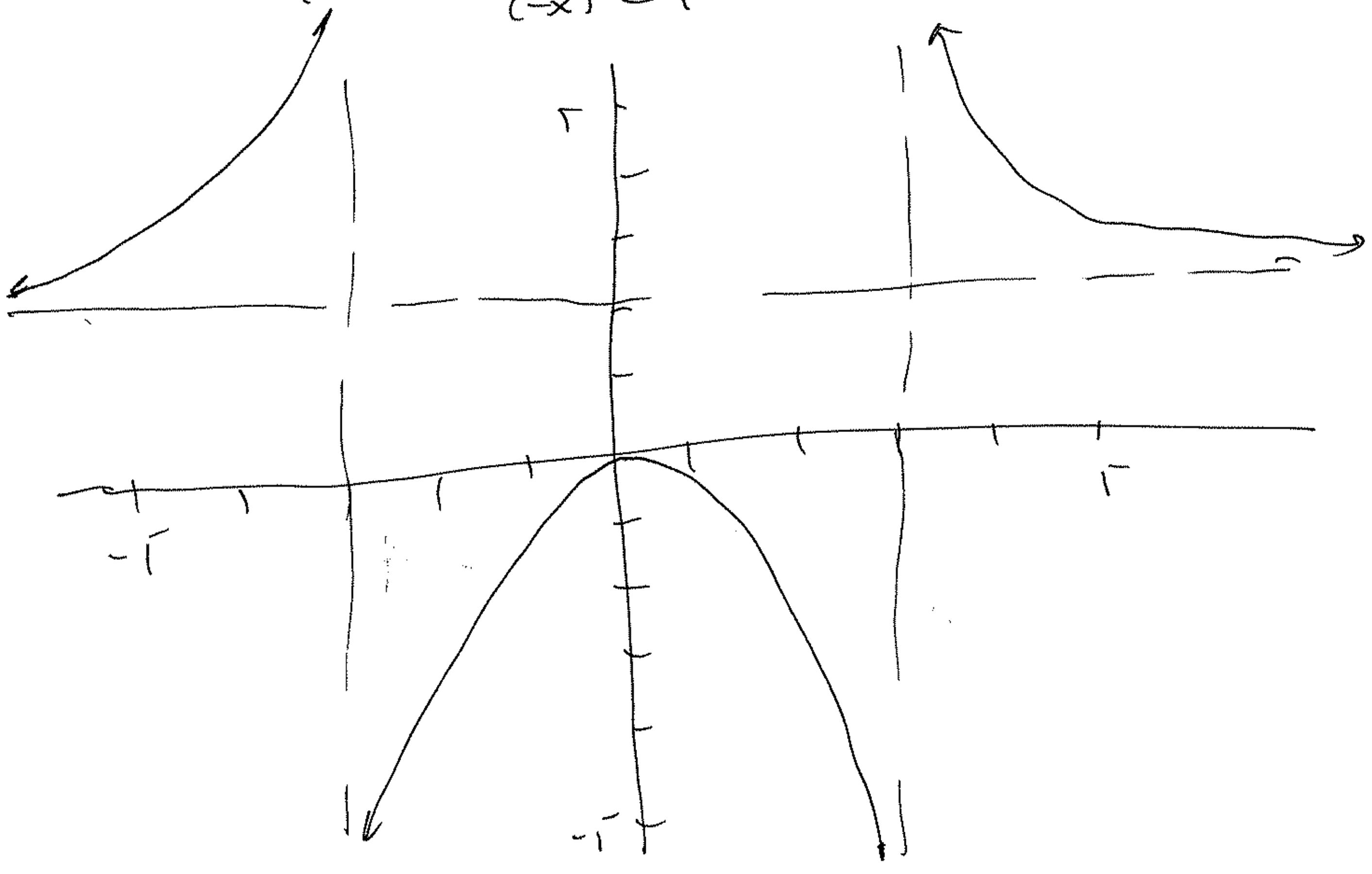
$-36x = 0 \Rightarrow x = 0$

$f' > 0$ $f' > 0$ $f' < 0$ $f' < 0$

Crec -3 Crec 0 Decrec 3 Decrec

$-3 \downarrow$ A.V $0 \downarrow$ Máximo relat $3 \downarrow$ A.V

* Simetrías: $f(-x) = \dfrac{2(-x)^2}{(-x)^2 - 9} = \dfrac{2x^2}{x^2-9} = \begin{cases} f(x) \text{ Sí} \rightarrow \text{PAR} \\ -f(x) \text{ no} \rightarrow \otimes \end{cases}$



①

1) i) $\lim_{x \to -1^-} f(x) = \frac{-a+2}{-1+2} = -a+2$

$\lim_{x \to -1^+} f(x) = (-1)^2 + (-1) = 0$

$f(-1) = -a+2$

$-a+2=0 \Rightarrow \boxed{a=2}$

ii) FUNCIONES $x=-2$; $x=3$

CONEXIONES $x=-1$; $x=3$

$\boxed{x=-2}$

$\lim_{x \to -2^-} f(x) = \frac{2(-2)+2}{-2+2} \to +\infty$

$\lim_{x \to -2^+} f(x) = -\infty$

$f(-2) \to \nexists$

D.I.S.I

$\boxed{x=-1}$ CONTINUA

$\boxed{x=3}$

$\lim_{x \to 3^-} f(x) = 12$

$\lim_{x \to 3^+} f(x) = +\infty$

$f(3) \Rightarrow \nexists$

D.I.S.I

2) i) $\lim_{x \to 2} \frac{(\sqrt{3x-2} - x)(\sqrt{3x-2}+x)}{(x^2-5x+6)(\sqrt{3x-2}+x)} =$

$= \lim_{x \to 2} \frac{(3x-2)-x^2}{(x-3)(x-2)(\sqrt{3x-2}+x)} = \lim_{x \to 2} \frac{-x^2+3x-2}{(x-3)(x-2)(\sqrt{3x-2}+x)} =$

$= \lim_{x \to 2} \frac{-(x-1)\cancel{(x-2)}}{(x-3)\cancel{(x-2)}(\sqrt{3x-2}+x)} = \lim_{x \to 2} \frac{-(x-1)}{(x-3)(\sqrt{3x-2}+x)} = \frac{-1}{-1 \cdot 4} = \frac{1}{4}$

ii)

$$\begin{array}{r|rrrr} & 1 & 0 & 0 & 1 \\ -1 & & -1 & 1 & -1 \\ \hline & 1 & -1 & 1 & 0 \end{array}$$

ii) $$\lim_{x\to -1} \frac{\cancel{(x+1)}(x^2-x+1)}{x\,\cancel{(x+1)}\,(x-5)} = \frac{(-1)^2-(-1)+1}{(-1)(-1-5)} = \frac{3}{6} = \frac{1}{2} //$$

iii) $$\lim_{x\to\infty} \frac{\left(\sqrt{4x^2+2x+1}-\sqrt{4x^2-x-2}\right)\left(\sqrt{4x^2+2x+1}+\sqrt{4x^2-x-2}\right)}{\left(\sqrt{4x^2+2x+1}+\sqrt{4x^2-x-2}\right)} =$$

$$= \lim_{x\to\infty} \frac{(4x^2+2x+1)-(4x^2-x-2)}{\sqrt{4x^2+2x+1}+\sqrt{4x^2-x-2}} =$$

$$= \lim_{x\to\infty} \frac{\cancel{4x^2}+2x+1-\cancel{4x^2}+x+2}{\sqrt{4x^2}+\sqrt{4x^2}} = \lim_{x\to\infty} \frac{3x+3}{4x} = \frac{3}{4} //$$

3) b) $f(3)=-27$. $\quad f'(3)=0$

$$f'(x)=3ax^2+2bx-9$$

$$f(3)=27a+9b-27=-27$$

$$f'(3)=27a+6b-9=0$$

$$\begin{matrix} 27a+9b=0 \\ 27a+6b=9 \end{matrix} \left\{ \begin{matrix} 3b=-9; & b=-3 // \\ 27a-27=0; & a=1 // \end{matrix} \right.$$

$$f(x)=x^3-3x^2-9x$$

$$f'(x)=3x^2-6x-9=0$$

$$x^2-2x-3=0; \quad x=\frac{2\pm\sqrt{4+12}}{2}=\frac{2\pm4}{2}=\left\langle\begin{matrix}3\\-1\end{matrix}\right.$$

$$f''(x)=6x-6. \qquad f''(-1)=-6-6=-12<0$$

$$f''(x)=0 \Rightarrow x=1 \qquad f''(3)=18-6=12>0$$

$\underbrace{E_1(3,-27)}_{\text{Mínimo relat}}$ $\qquad$ $\underbrace{E_2(-1,5)}_{\text{máximo relat}}$

$I_1(1,-11)$ → Inflexión

②

3) a)

i) $f'(x) = 2x\sqrt{x^2-1} + x^2 \cdot \dfrac{\cancel{2}x}{\cancel{2}\sqrt{x^2-1}} =$

$= \dfrac{2x(x^2-1)+x^3}{\sqrt{x^2-1}} = \dfrac{3x^3-2x}{\sqrt{x^2-1}}$ //

ii) $g'(x) = 3\left(\dfrac{x}{x-2}\right)^2 \cdot \left(\dfrac{1(x-2)-1 \cdot x}{(x-2)^2}\right) =$

$= 3\left(\dfrac{x}{x-2}\right)^2 \cdot \dfrac{-2}{(x-2)^2} = \dfrac{-6x^2}{(x-2)^4}$ //

4) Dominio: $x^2-4x=0$; $x(x-4)=0 \begin{cases} x=0 \\ x=4 \end{cases}$

$D = \mathbb{R} \setminus \{0, 4\}$

Corte ejes $\begin{cases} OX: \text{ no corte} \\ OY \text{ no corte} \end{cases}$

A.H: $\lim\limits_{x\to+\infty} f(x) = 0$; $\lim\limits_{x\to-\infty} f(x) = 0$ $|\ \boxed{y=0}$ dos lados

A.V: $x=0$, $x=4$ /

$\lim\limits_{x\to 0^-} f(x) = +\infty$ $\lim\limits_{x\to 0^+} f(x) = -\infty$

$\lim\limits_{x\to 4^-} f(x) = -\infty$ $\lim\limits_{x\to 4^+} f(x) = +\infty$

Extr relat $f'(x) = \dfrac{0(x^2-4x)-(2x-4)\cdot 2}{(x^2-4x)^2} = \dfrac{-4x+8}{(x^2-4x)^2} = 0$

$-4x+8=0 \Rightarrow x = 2 \to f(2) = \dfrac{2}{2^2-4\cdot 2} = \dfrac{2}{4-8} = \dfrac{2}{-4} = -\dfrac{1}{2}$

$f'>0$ | $f'>0$ | $f'<0$ | $f'<0$

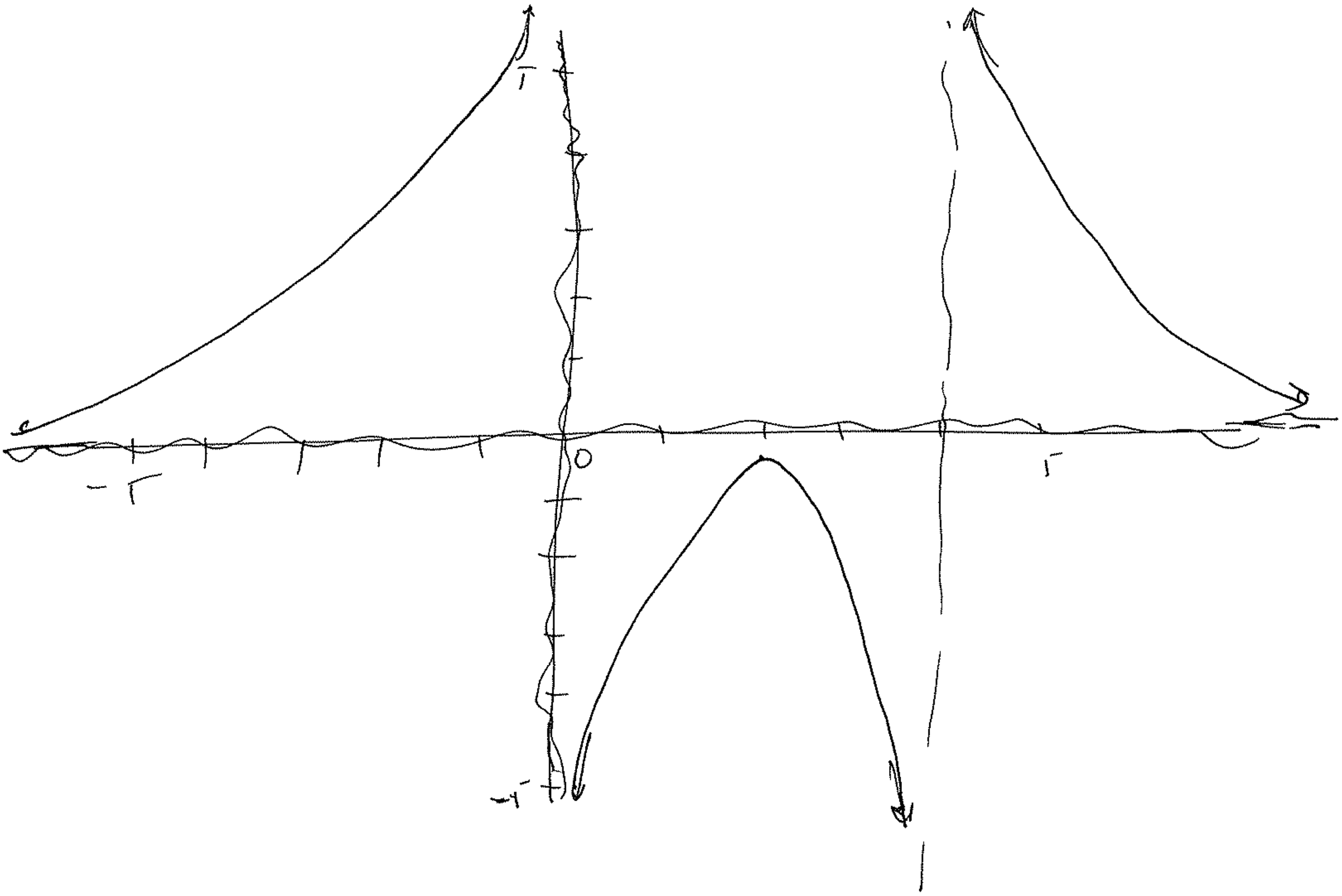
Crec. 0 Decrec 2 Decrec 4 Decrec

0 → A.V

2 → Máx relat $(2, -1/2)$

4 → A.V

Simt $f(-x) = \frac{2}{(-x)^2 - 4(-x)} = \frac{2}{x^2+4x} \rightarrow$ no tiene



1)

x	y	f	xf	yf	xxf	yyf	xyf
0	8	2	0	16	0	128	0
1	6	3	3	18	3	108	18
1	7	5	5	35	5	245	35
2	5	7	14	35	28	175	70
3	5	4	12	20	36	100	60
4	3	6	24	18	96	54	72
5	0	3	15	0	75	0	0
		30	73	142	243	810	255

Med x	2,43333	Cov	-3,0178	
Med y	4,73333	r	-0,9537	
Var x	2,17889	Fiab	90,9497	
Var y	4,59556			
Dt x	1,47611	Y (x)	-1,385	8,10352
Dt y	2,14372	X(y)	-0,6567	5,54159

a) $r = -0'9537$; Rel inversa y fuerte

b) $y(3'5) = -1'385 \times 3'5 + 8'10 = \underline{\underline{3'26}}$

2)
$(0,0)^0 \quad (0,1)^0 \quad (0,2)^0 \quad (0,3)^0$
$(1,0)^0 \quad (1,1)^1 \quad (1,2)^2 \quad (1,3)^3$
$(2,0)^0 \quad (2,1)^2 \quad (2,2)^4 \quad (2,3)^6$
$(3,0)^0 \quad (3,1)^3 \quad (3,2)^6 \quad (3,3)^9$

$E = \{0, 1, 2, 3, 4, 6, 9\}$

$p(0) = \frac{7}{16}$; $p(1) = \frac{1}{16}$; $p(2) = \frac{2}{16}$

$p(3) = \frac{2}{16}$; $p(4) = \frac{1}{16}$; $p(6) = \frac{2}{16}$; $p(9) = \frac{1}{16}$

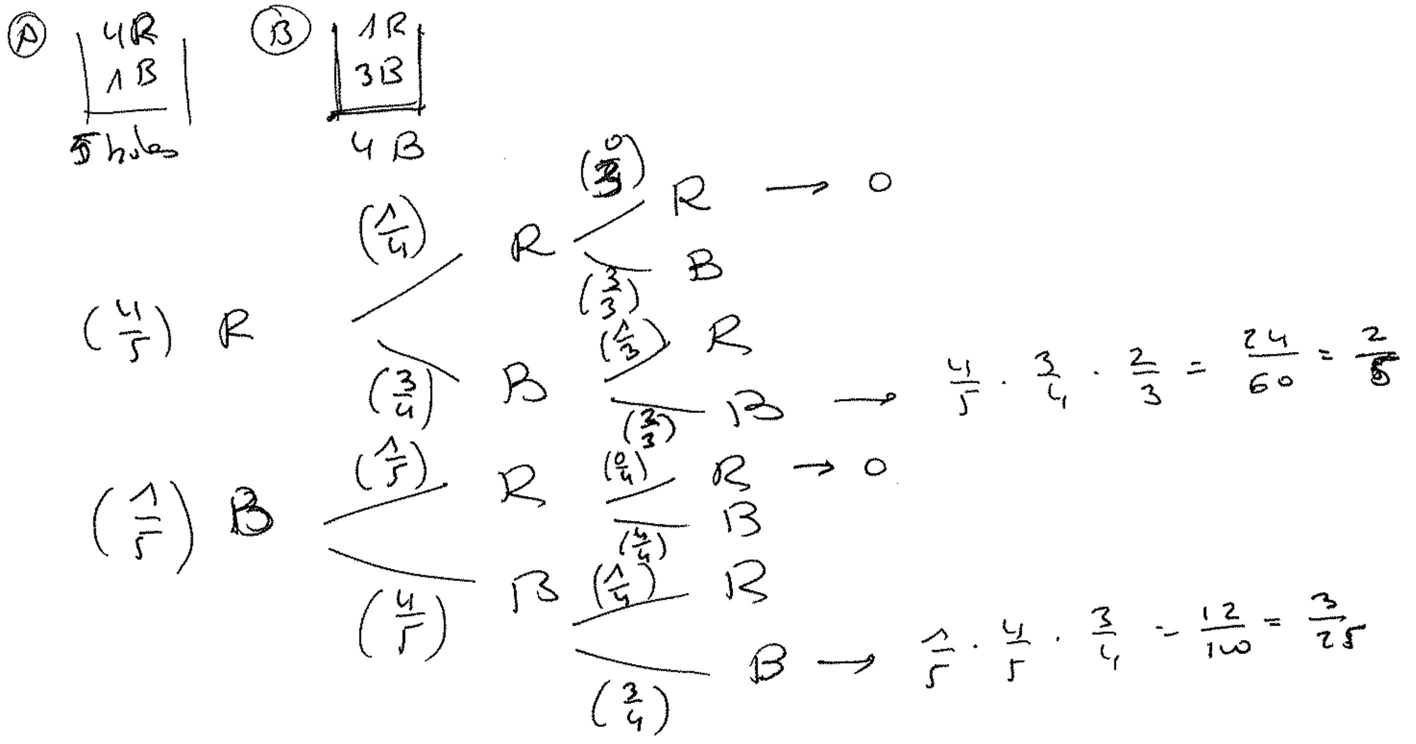
b) TEÓRICO

c) $P(A \cup B) = \frac{9}{16}$; $P(A \cap B) = \frac{1}{16} + \frac{2}{16} + \frac{1}{16} = \frac{4}{16}$

$A \cup B = \{1, 2, 3, 4, 5, 6\}$

$A \cap B = \{1, 3, 9\}$

3)



a) $P(R,R) = 0$ //

b) $p(B,B) = \frac{2}{5} + \frac{3}{25} = \frac{10}{25} + \frac{3}{25} = \frac{13}{25}$ // 52%

c) $= 1 - 0 - \frac{13}{25} = \frac{25-13}{25} = \frac{12}{25}$ // 48%

4) X → B(6, 0'7)

p = 0'7 (vive < 80 años) q = 0'3 (vive > 80 años)

a) P(4F) = P(2E) = P(X=2) = $\binom{6}{2}$(0'7)^2(0'3)^4 = 0'05 — 0'07 → 7%

+P(5F) + P(6F) +P(1E) → 0'0102 +P(0E) → 0'0007

b) p(1E) + p(2E) + —— + (6E) = 1 − P(0E) = 1 − $\binom{6}{0}$(0'7)^0(0'3)^6 = 0'99

99%

c) P(X=3) + P(X=4) + P(X=5) = $\binom{6}{3}$(0'7)^3(0'3)^3 + $\binom{6}{4}$(0'7)^4(0'3)^2 + $\binom{6}{5}$(0'7)^5(0'3)

= 0'18 + 0'32 + 0'30 = 0'81 — 81%

5) a) $z_1 = \frac{160-166}{5}$ = P(Z ≥ −1'2) = P(Z ≤ 1'2) = 0'8849

b) $z_1 = \frac{158-166}{5}$ = −1'6 ; $z_2 = \frac{165-166}{5}$ = −0'2

P(−1'6 ≤ Z ≤ −0'2) = P(Z ≤ −0'2) − P(Z ≤ −1'6) =

= (1 − P(Z ≤ 0'2)) − (1 − P(Z ≤ 1'6)) = (1 − 0'5793) − (1 − 0'9452) =

= 0'4207 − 0'0548 = 0'3659 c) (0'8849)^4 = 0'6131

1)

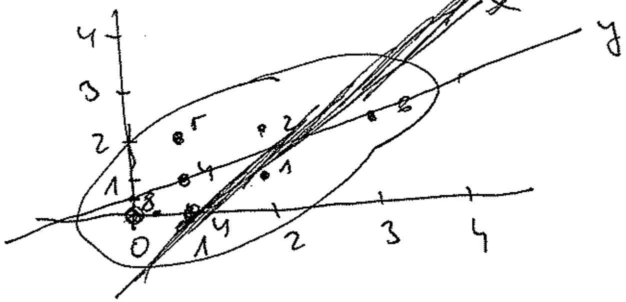
x	y	f	xf	yf	xxf	yyf	xyf
0	0	8	0	0	0	0	0
1	1	4	4	4	4	4	4
1	2	5	5	10	5	20	10
1	0	4	4	0	4	0	0
2	1	1	2	1	4	1	2
2	2	2	4	4	8	8	8
3	2	6	18	12	54	24	36
		30	37	31	79	57	60

Med x	1,23333
Med y	1,03333
Var x	1,11222
Var y	0,83222
Dt x	1,05462
Dt y	0,91226

Cov	0,72556	
r	0,75415	
Fiab	56,8736	
Y (x)	0,65235	0,22877
X(y)	0,87183	0,33244

x	0	4
y	0'23	2'8

x	0'33	3'7
y	0	4



X(3) = 0'87 × 3 + 0'33 = 2'61 + 0'33 = 2'94

2) P(A) = $\frac{7}{12}$ 1 ; P(B) = $\frac{4}{12}$ 1 ; P(C) = $\frac{8}{12}$ 1

P(A∪B) = $\frac{7}{12}$ 2 P(A∪C) = 1 ; 2 P(A∩B) = $\frac{4}{12}$ 2 ; P(B∩C) = 0 1

5) Z = $\frac{X-15}{4}$; a) P(10 ≤ X ≤ 13) = P(~~z~~ -1'25 ≤ Z ≤ -0'5) =

= P(Z ≤ -0'5) - P(Z ≤ -1'25) = (1 - P(Z ≤ 0'5)) - (1 - P(Z ≤ 1'25)) =

= (1 - 0'6915) - (1 - 0'8944) = 0'3085 - 0'1056 = 0'2029

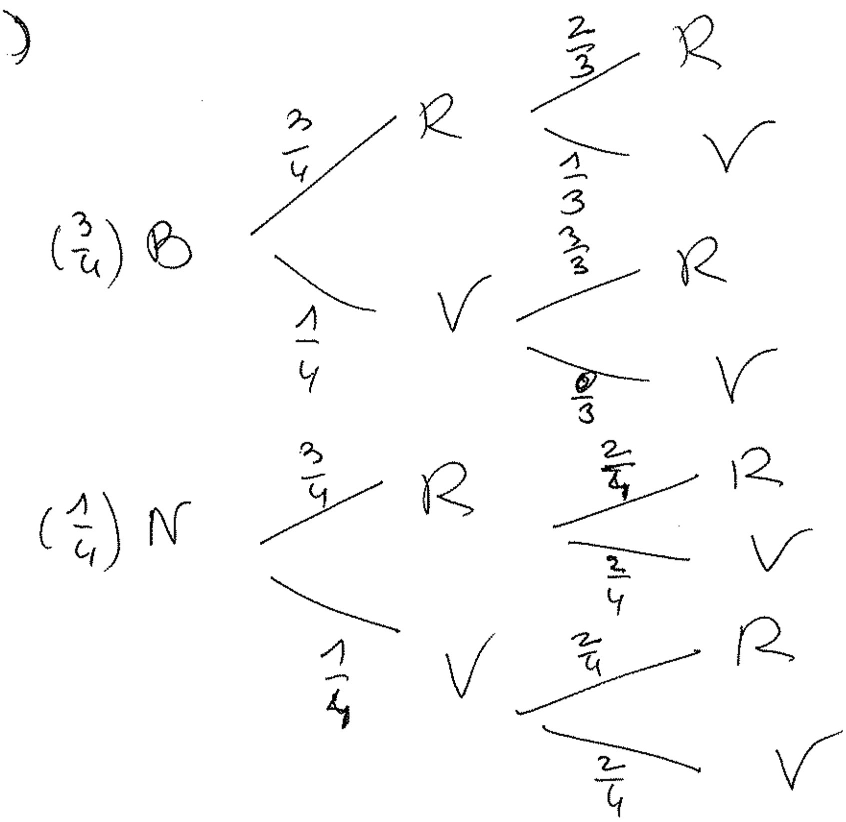
b) P(X ≤ 17) = P(Z ≤ 0'5) = 0'6915

c) P(X ≥ 20) = P(Z ≥ 1'25) = 1 - P(Z ≤ 1'25) = 1 - 0'8944 = 0'1056

180 × 0'1056 = 19 pac

3)

Ⓐ 3B 1N   Ⓑ 3R 1V   Ⓒ 2R 2V



$\frac{9}{24}+\frac{3}{32}=\frac{36}{96}+\frac{9}{96}=\frac{45}{96}=\frac{15}{32}$

a) $\frac{3}{4}\cdot\frac{3}{4}\cdot\frac{2}{3}+\frac{1}{4}\cdot\frac{3}{4}\cdot\frac{2}{4}=\frac{18}{48}+\frac{6}{64}=0'46875\rightarrow 46'875\%$

b) $\frac{3}{4}\cdot\frac{1}{4}\cdot 0+\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{2}{4}=\frac{2}{64}=\frac{1}{32}=0'03125\rightarrow 3'125\%$

c) $\frac{3}{4}\cdot\frac{3}{4}\cdot\frac{1}{3}+\frac{3}{4}\cdot\frac{1}{4}\cdot 0+\frac{1}{4}\cdot\frac{3}{4}\cdot\frac{2}{4}+\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{2}{4}=$

$\frac{3}{16}+\frac{1}{8}=\frac{5}{16}$

$=\frac{9}{48}+0+\frac{6}{64}+\frac{2}{64}=\frac{9}{48}+\frac{8}{64}=0'3125\rightarrow 31'25\%$

4) $X — B(12, 0'35)$ $p=0'35$. $q=0'65$

a) $P(3E)+P(4E)+ — +P(12E)=1-(P(0E)+P(1E)+P(2E))=$

$=1-\left(\binom{12}{0}(0'35)^0(0'65)^{12}+\binom{12}{1}(0'35)^1(0'65)^{11}+\binom{12}{2}(0'35)^2(0'65)^{10}\right)=$

$=1-(0'005+0'036+0'108)=1-0'149=0'85\rightarrow 85\%$

b) $P(1E)+ — P(12E)=1-P(0E)=1-0'005=0'995\rightarrow 99'5\%$

c) $P(10F)+P(11F)+P(12F)=P(2E)+P(1E)+P(0E)=$

$=0'149\rightarrow 14'9\%$