COLEGIO ALMA'S
bilingual school

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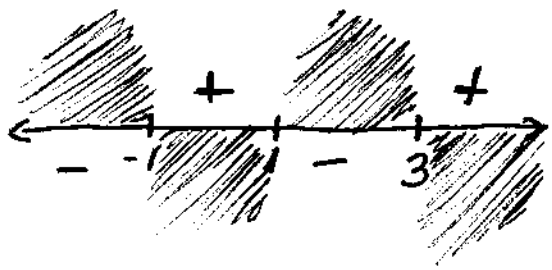
Corrección Examen Matemáticas CC.SS. 1 - 3ºEso 1º Bachillerato - 25-06-18

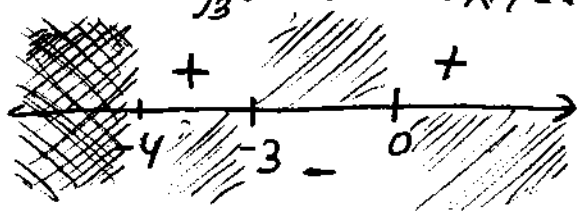
1.- a) $Dom\, f(x) = \mathbb{R}$

$(x-3)\sqrt[3]{x^2-1}=0 \begin{cases} x-3=0 \to x=3 \\ x^2-1=0 \to x=\pm 1 \end{cases}$



b) $Dom\, g(x) = (-4, \infty)$

$x \cdot \log_3(x+4)=0 \begin{cases} x=0 \\ \log_3(x+4)=0 \to x+4=1 \to x=-3 \end{cases}$



2.- a) $Dom\, f(x) = \mathbb{R}-\{-1\}$

AV: $\boxed{x=-1}$

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

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

AH: $\boxed{y=2}$

$\lim_{x\to \pm\infty} \frac{2x-1}{x+1} = \left\{\frac{\infty}{\infty}\right\} \overset{L'H}{=} \lim_{x\to\infty} \frac{2}{1} = 2$

AO: no presenta por tener ya AH

b) $Dom\, g(x) = \mathbb{R}-\{-1\}$

AV: $\boxed{x=-1}$

$\lim_{x\to -1^-} 2x - \frac{1}{x+1} = -2 - \frac{1}{-0} = -2+\infty = \infty$

$\lim_{x\to -1^+} 2x - \frac{1}{x+1} = -2 - \frac{1}{+0} = -2-\infty = -\infty$

AH: no tiene

$\lim_{x\to \pm\infty} 2x - \frac{1}{x+1} = \pm\infty - 0 = \pm\infty$

AO: $\boxed{y=2x}$

$m = \lim_{x\to\pm\infty} \frac{2x - \frac{1}{x+1}}{x} = \lim_{x\to\pm\infty} 2 - \frac{1}{x^2+x} = 2-0 = 2$

$n = \lim_{x\to\pm\infty} 2x - \frac{1}{x+1} - 2x = \lim_{x\to\pm\infty} -\frac{1}{x+1} = \frac{-1}{\infty} = 0$

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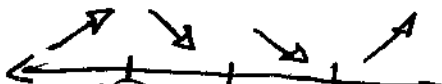
3.- a) Dom $f(x) = \mathbb{R} - \{-1\}$.

$$f'(x) = \frac{2x(x+1) - x^2}{(x+1)^2} = \frac{2x^2+2x-x^2}{(x+1)^2} = \frac{x^2+2x}{(x+1)^2} = 0 \longrightarrow x^2+2x=0$$

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

$x=0$ $\quad$ $x=-2$

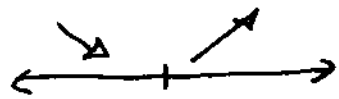
Ptos Extremos.



MAX local $\quad$ MIN local.

b) Dom $g(x) = \mathbb{R}$.

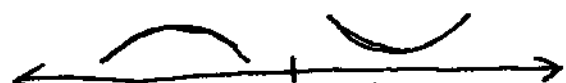
$$g'(x) = \frac{2(x-1)}{4} = \frac{x-1}{2} = 0 \longrightarrow x-1=0 \longrightarrow x=1 \text{ Pto Extremo}$$



MIN Global o Absoluto

4.- a) Dom $f(x) = \mathbb{R}$

$f'(x) = 3x^2 - 1$



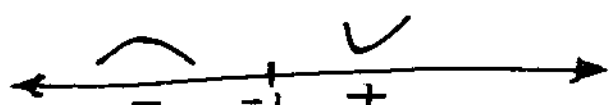
$f''(x) = 6x = 0 \longrightarrow x = 0$ Pto de inflexión

b) Dom $g(x) = \mathbb{R} - \{-1\}$

$$g'(x) = \frac{x^2+2x}{(x+1)^2}$$

$$g''(x) = \frac{(2x+2)(x+1)^2 - (x^2+2x)\cdot 2(x+1)}{(x+1)^4} = \frac{(2x+2)(x+1) - 2(x^2+2x)}{(x+1)^3}$$

$$g''(x) = \frac{2x^2+4x+2-2x^2-4x}{(x+1)^3} = \frac{2}{(x+1)^3} \neq 0$$ Sin ptos de inflexión



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5.- $4x+3y=200 \longrightarrow y=\frac{200-4x}{3}$

$\max 2x\cdot y \longrightarrow \max f(x)=\frac{400x-8x^2}{3} \longrightarrow Dom f(x)=\mathbb{R}$.

$f'(x)=\frac{400-16x}{3}=0 \rightarrow x=\frac{400}{16} \longrightarrow \boxed{x=25m}$

$+\ (25)\ -$ $\longrightarrow y=\frac{200-4\cdot 25}{3}=\boxed{\frac{100}{3}\ m}$

6.- 6.1) $\int\left(2x^4-\frac{3}{x^3}+\frac{2}{3x+1}-e^{2x}\right)dx=\boxed{\frac{2x^5}{5}+\frac{3}{x}+\frac{2}{3}\ln|3x+1|-\frac{1}{2}e^{2x}+K}$

6.2) $\int\frac{x^{1/2}-x^2}{x^{3/2}}dx=\int(x^{-1}-x^{1/2})dx=\ln x-\frac{x^{3/2}}{\frac{3}{2}}+K=\boxed{\ln x-\frac{2x\sqrt{x}}{3}+k}$

6.3) $\int x\cdot 5^{2x^2-3}dx=\int x\cdot 5^t\frac{dt}{4x}=\frac{1}{4}\frac{5^t}{\ln 5}+K=\boxed{\frac{5^{2x^2-3}}{4\ln 5}+K}$

$t=2x^2-3$

$dt=4x\,dx \rightarrow dx=\frac{dt}{4x}$

6.4) $\int x\sqrt{x-1}\,dx=\int(t^2+1)\,t\cdot 2t\,dt=\int(4t^4+2t^2)dt=\frac{4t^5}{5}+\frac{2t^3}{3}+K$

$t^2=x-1 \longrightarrow x=t^2+1$

$2t\,dt=dx$

$=\boxed{\frac{4}{5}\sqrt{(x+1)^5}+\frac{2}{3}\sqrt{(x+1)^3}+K}$

6.5) $\int\frac{(x+1)^2}{x(x+1)}dx=\int\frac{x+1}{x}dx=\int\left(1+\frac{1}{x}\right)dx=\boxed{x+\ln|x|+K}$

6.6) $\int\frac{2}{x^2(x-2)}dx=\int\left(\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x-2}\right)dx=\boxed{-\frac{1}{2}\ln|x|+\frac{1}{x}+\frac{1}{2}\ln|x-2|+K}$

$2=Ax(x-2)+B(x-2)+Cx^2$

$x=0$, $x=2$, $x=1$

$2=-2B \longrightarrow B=-1$

$2=4C \longrightarrow C=1/2$

$2=-A+1+\frac{1}{2} \rightarrow A=-1/2$

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7.- a)

Intervalos	f_i	F_i	h_i	H_i	x_i	$x_i f_i$	$x_i^2 f_i$	$\lvert x_i - \bar{x}\rvert f_i$
[1,5)	2	2	0'07	0'07	3	6	18	20'8
[5,9)	4	6	0'13	0'2	7	28	196	25'6
[9,13)	7	13	0'23	0'43	11	77	847	16'8
[13,17)	11	24	0'37	0'8	17	165	2475	17'8
[17,21)	3	27	0'1	0'9	19	57	1083	16'8
[21,25	3	30	0'1	1	23	69	1587	28'8
	n=30					402	6206	126'40

b) $\bar{x} = \frac{402}{30} = 13'4$ $\quad Mo = 13 + (17-13)\frac{4}{4+8} = 14'3$ $\quad Me = 13 + (11-13)\frac{15-13}{24-13} = 13'72$

c) $D_4 = 9 + (13-9)\frac{12-6}{13-6} = 12'43$

$P_{65} = 13 + (17-13)\frac{19'5-13}{24-13} = 13'36$

d) $Q_3 = 13 + (17-13)\frac{22'5-13}{24-13} = 16'45$ $\quad Q_1 = 9 + (13-9)\frac{7'5-6}{13-6} = 9'86$

$R_I = 16'45 - 9'86 = 6'59$ $\quad DM = \frac{126'40}{30} = 4'21$

e) $Sx = \sqrt{\frac{6206}{30} - 13'4^2} = 5'23$ $\quad Cv = \frac{5'23}{13'4} = 0'39$

8.- a) $\bar{x} = \frac{1921}{178} = 10'79$ $\quad \bar{y} = \frac{2612}{178} = 14'67$

$Sx = \sqrt{\frac{24423}{178} - 10'79^2} = 4'55$ $\quad Sy = \sqrt{\frac{45200}{178} - 14'67^2} = 6'21$

b) $Sxy = \frac{32786}{178} - 10'79 \cdot 14'67 = 25'9$ $\quad r = \frac{25'9}{4'55 \cdot 6'21} = 0'92 \rightarrow D = 84\%$

c) $\hat{y} = 14'67 + \frac{25'9}{4'55^2}(1 - 10'79) = 2'42$

$\hat{x} = 10'79 + \frac{25'9}{6'21^2}(0 + 14'67) = 0'94$