COLEGIO ALMA'S
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Corrección Recuperación 2ª Ev. Matemáticas I – 1º Bachillerato Ciencias

06-04-2018

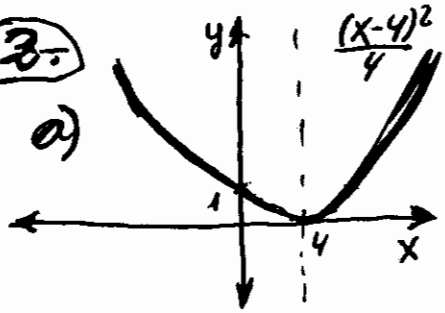
1.- a) $\frac{-2i^\circ - i^\circ}{3i^\circ - 1} = \frac{-3i^\circ}{3i^\circ - 1} \cdot \frac{3i^\circ + 1}{3i^\circ + 1} = \frac{-9i^{2^\circ} - 3i^\circ}{-9 - 1} = \boxed{\frac{-9}{10} + \frac{3}{10}i^\circ}$

b) $(\sqrt{3} + i^\circ)^3 = \left(2_{\frac{\pi}{6}}\right)^3 = 8_{\frac{\pi}{2}} = \boxed{8i^\circ}$

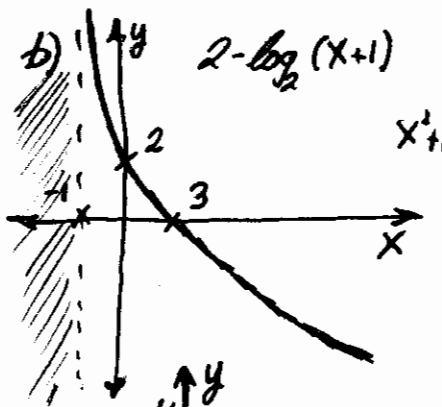
c) $\sqrt[4]{8 - 8\sqrt{3}\,i} = \sqrt[4]{16_{\frac{5\pi}{3}}} = \boxed{2_{\frac{5\pi}{12}}, 2_{\frac{11\pi}{12}}, 2_{\frac{17\pi}{12}}, 2_{\frac{23\pi}{12}}}$

3.-

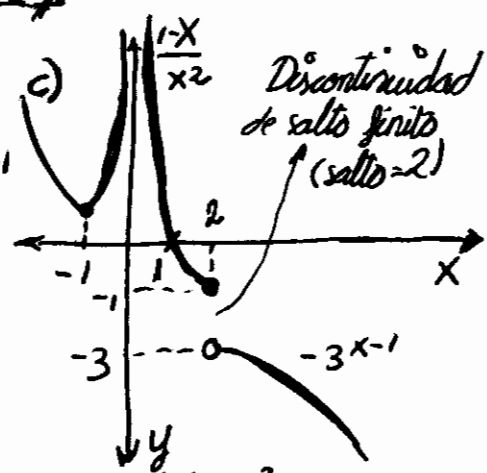
a) $\frac{(x-4)^2}{4}$



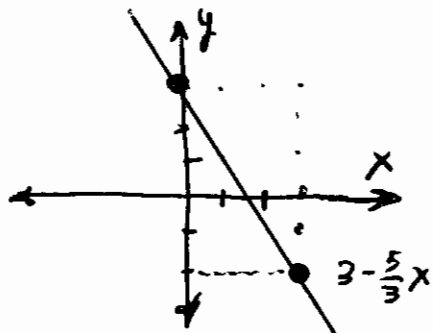
b) $2 - \log_2(x+1)$



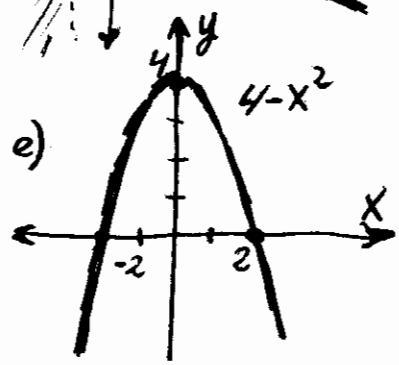
c) $\frac{1-x}{x^2}$ x^2+1 Discontinuidad de salto finito (salto=2)



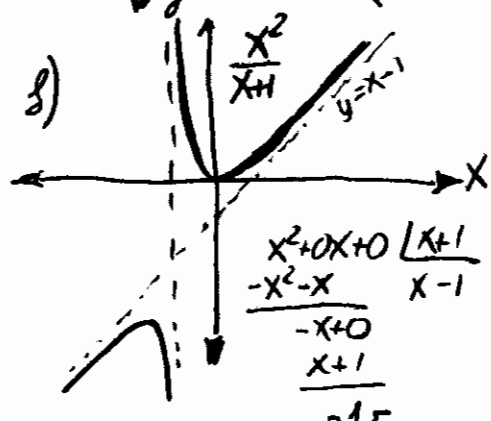
d)



e) $4 - x^2$

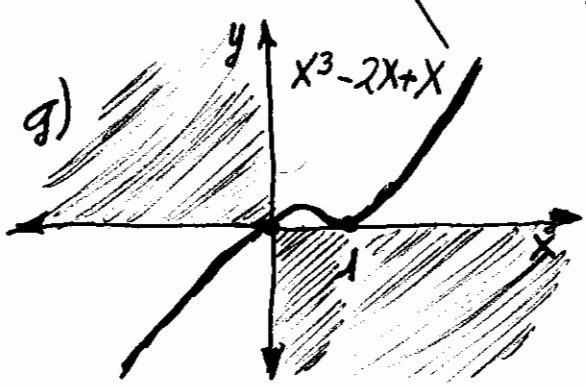


f) $\frac{x^2}{x+1}$ $y = x - 1$

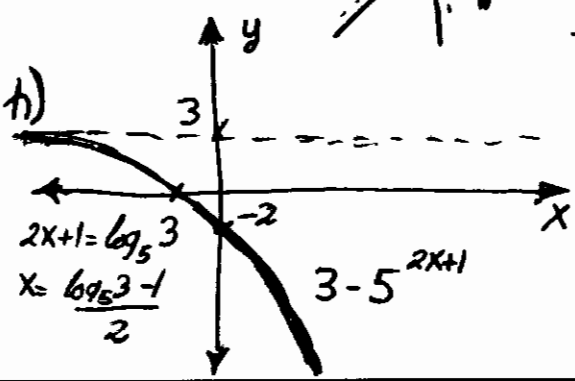


$x^2 + 0x + 0 \;|\; x+1$
$-x^2 - x \quad\quad x - 1$
$-x + 0$
$x + 1$
1

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



h)



$2x + 1 = \log_5 3$

$x = \frac{\log_5 3 - 1}{2}$

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3.- a) $y' = \dfrac{\frac{2x}{\cos^2(x^2+1)}\cdot(x+1)^2 - 2(x+1)\operatorname{tg}(x^2+1)}{(x+1)^4}$

b) $y' = \cos(2x-x^2) - x(2-2x)\operatorname{sen}(2x-x^2)$

c) $y' = \dfrac{1-2x}{4\cdot\sqrt[4]{(x-x^2)^3}}$

d) $\ln y = x\ln(x+\operatorname{sen}x) \longrightarrow y' = \left[\ln(x+\operatorname{sen}x) + \dfrac{x(1+\cos x)}{x+\operatorname{sen}x}\right](x+\operatorname{sen}x)^x$

e) $y' = -4\operatorname{sen}2x \cdot 2^{1+2\cos 2x}\cdot \ln 2$

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

g) $y' = 4\left(\dfrac{1}{x} - \dfrac{1}{2}\dfrac{1}{x+1}\right) = \dfrac{4}{x} - \dfrac{2}{x+1}$

4.- a) $\lim_{x\to-\infty} \dfrac{x^3-2x}{3-x^2+3x^3} = \lim_{x\to-\infty} \dfrac{1-\frac{2}{x^2}}{\frac{3}{x^3}-\frac{1}{x}+3} = \dfrac{1-0}{0-0+3} = \boxed{\dfrac{1}{3}}$

b) $\lim_{x\to\infty} \dfrac{2e^x-x}{3x-1} \overset{\infty/\infty}{\underset{L'H}{=}} \lim_{x\to\infty} \dfrac{2e^x-1}{3} = \dfrac{\infty-1}{3} = \boxed{\infty}$

c) $\lim_{x\to0} \dfrac{x\operatorname{sen}x}{x^2} \underset{Inf}{=} \lim_{x\to0} \dfrac{x^2}{x^2} = \boxed{1}$

d) $\lim_{x\to1} \dfrac{3x^2-3}{x^2+3x+2} = \dfrac{0}{6} = \boxed{0}$

e) $\lim_{x\to1^+} \ln(x^4-1) - x = -\infty - 1 = \boxed{-\infty}$

f) $\lim_{x\to3} \dfrac{\sqrt{x^2-9}}{\ln(x-3)} = \dfrac{0}{\infty} = \boxed{0}$

g) $\lim_{x\to1} (x-1)^2\ln x = 0\cdot0 = \boxed{0}$

h) $\lim_{x\to\infty} \left(\dfrac{x^2}{3x^2-1}\right)^x = \left(\dfrac{1}{3}\right)^\infty = \boxed{0}$

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i) $\lim_{x\to\infty} \sqrt{x-2}-\sqrt{x-1}\cdot\frac{\sqrt{x-2}+\sqrt{x-1}}{\sqrt{x-2}+\sqrt{x-1}} = \lim_{x\to\infty}\frac{x-2-x+1}{\sqrt{x-2}+\sqrt{x-1}} = \frac{-1}{\infty+\infty} = \boxed{0}$

j) $\lim_{x\to\infty}\left(\frac{x+3}{x+1}\right)^{x-1} \overset{1^\infty}{=} e^{\lim_{x\to\infty}(x-1)\left(\frac{x+3}{x+1}-1\right)} = e^{\lim_{x\to\infty}\frac{2x-2}{x-1}} = \boxed{e^2}$

5. $f(x) = x\cdot\ln x \longrightarrow f'(x) = \ln x + 1$

$f(1) = 1\cdot\ln 1 = 0 \qquad f'(1) = \ln 1 + 1 = 1$

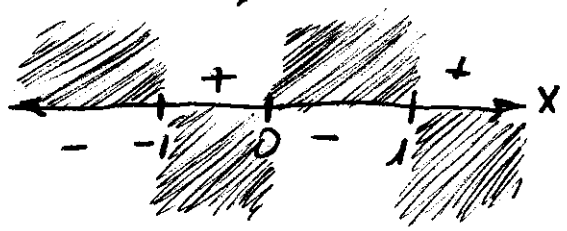
Recta tangente $\longrightarrow y-0 = 1(x-1) \longrightarrow \boxed{y = x-1}$

Recta normal $\longrightarrow y-0 = \frac{-1}{1}(x-1) \longrightarrow \boxed{y = -x+1}$

6. a) $Dom\left(x\sqrt[3]{x^2-1}\right) = \mathbb{R}$.

$x\cdot\sqrt[3]{x^2-1} = 0 \longrightarrow x = 0$

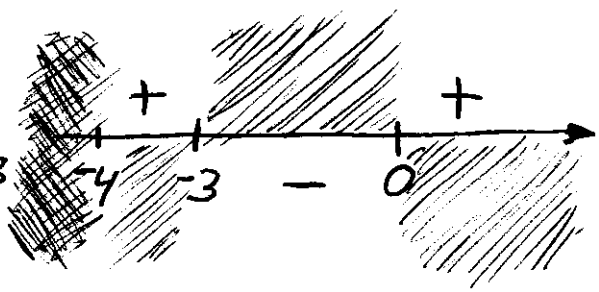
$x^2-1 = 0 \longrightarrow x = \pm 1$



b) $Dom\left(x\log_3(x+4)\right) = (-4,\infty)$

$x\log_3(x+4) = 0 \longrightarrow x = 0$

$x+4 = 1 \longrightarrow x = -3$



7. a) $Dom\left(\frac{x^2-1}{x^2}\right) = \mathbb{R}-\{0\}$.

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

AH: $\boxed{y=1}$ $\lim_{x\to\pm\infty}\frac{x^2-1}{x^2} \overset{L'H}{=} \frac{\infty}{\infty} \lim_{x\to\pm\infty}\frac{2x}{2x} = 1 \Rightarrow$ No tiene AO.

b) $Dom\ \frac{\sqrt{x+1}}{x} = [-1,0)\cup(0,\infty)$

AV: $\boxed{x=0}$ $\lim_{x\to -1^+}\frac{\sqrt{x+1}}{x} = \frac{0}{-1} = 0$

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

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

AH: $\boxed{y=0}$

$\lim_{x\to\infty}\frac{\sqrt{x+1}}{x} \overset{L'H}{=} \frac{\infty}{\infty} \lim_{x\to\infty}\frac{1}{2\sqrt{x+1}} = \frac{1}{\infty} = 0$

No tiene AO por tener horizontal

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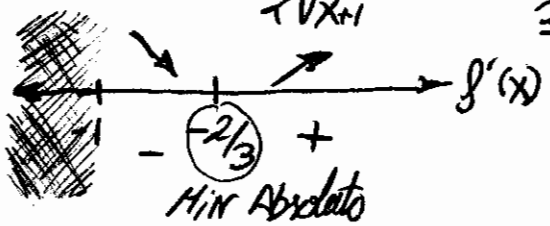
8. a) Dom $x\sqrt{x+1} = [-1, \infty)$

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

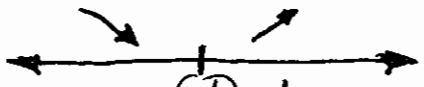
$$3x = -2 \rightarrow x = -2/3$$



Mín Absoluto

b) Dom $xe^x = \mathbb{R}$.

$$g'(x) = e^x + xe^x = (1+x)e^x = 0 \rightarrow 1+x=0 \rightarrow x=-1$$

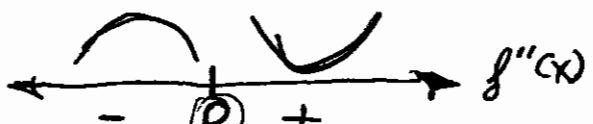


Mín Absoluto.

9. a) Dom$(x^3 - x) = \mathbb{R}$.

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

$$f''(x) = 6x = 0 \rightarrow x = 0$$



Pts Infl.

b) Dom $\frac{x^2}{x+1} = \mathbb{R} - \{-1\}$.

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

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

$2 \neq 0 \rightarrow$ Sin ptos de inflexión