COLEGIO ALMA'S
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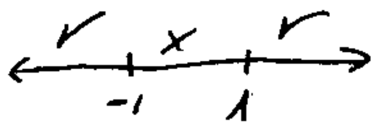
Corrección 1º Control 3ª Evaluación - Matemáticas CC.SS. 1
1º Bachillerato - C. Sociales - 19-04-2018

1.- $\frac{x+1}{x-1} \geq 0$ $\quad$ mcm $= x-1 \rightarrow x = 1$

$x+1=0 \rightarrow x=-1$

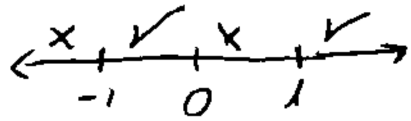


$\boxed{\text{Dom} \sqrt[4]{\frac{x+1}{x-1}} = (-\infty, -1] \cup (1, \infty)}$

$\text{Dom } \log(x^3-x) = \boxed{(-1,0) \cup (1,\infty)}$

$x^3 - x > 0$

$x(x^2-1)=0 < \begin{matrix} x=0 \\ x=\pm 1 \end{matrix}$

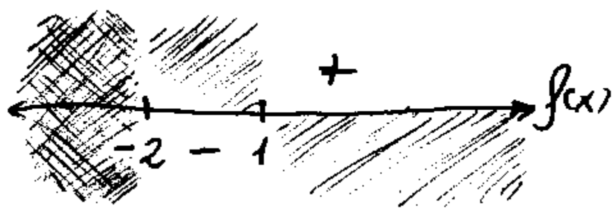


$\text{Dom } \frac{xe^x}{x^2-x} = \boxed{\mathbb{R} - \{0,1\}}$ $\qquad$ $\text{Dom} \sqrt[5]{x^3 e^{x-1}} = \boxed{\mathbb{R}}$

2.- 2.1) $\text{Dom } f(x) = [-2, \infty)$

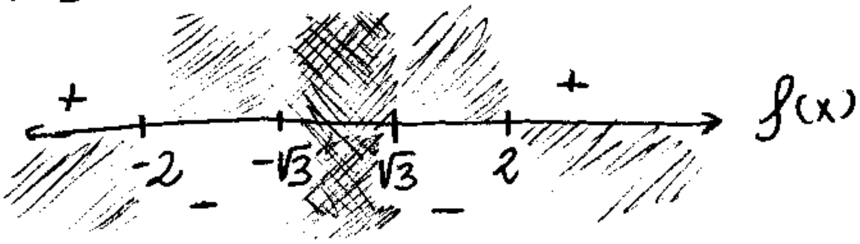
Cortes OX $\rightarrow x-1=0 \rightarrow x=1$

$\sqrt{x+2}=0 \rightarrow x+2=0 \rightarrow x=-2$



2.2) $f(x) = e^x \ln(x^2-3)$ ___ $\text{Dom } f(x) = (-\infty, -\sqrt{3}) \cup (\sqrt{3}, \infty)$

$\left.\begin{matrix} \ln(x^2-3)=0 \\ x^2-3=1 \rightarrow x^2=4 \rightarrow x=\pm 2 \end{matrix}\right\}$ Cortes OX: $x = \pm 2$



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3.- $f(x) = 2 \cdot e^{\frac{x}{x-1}} \longrightarrow \text{Dom } f(x) = \mathbb{R} - \{1\}$.

3.1) AV: $\boxed{x=1}$

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

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

AH: $\boxed{y=2e}$

$$\lim_{x \to \pm\infty} 2e^{\frac{x}{x+1}} = 2 \cdot e^{\lim_{x \to \pm\infty} \frac{x}{x+1}} = \boxed{2e}$$

No tiene asíntota oblícua por tener horizontal

3.2) $\text{Dom } \frac{x^3-1}{x^2-1} = \mathbb{R} - \{\pm 1\}$.

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

$$\lim_{x \to 1} \frac{x^3-1}{x^2-1} \underset{\frac{0}{0}}{\overset{L'H}{=}} \lim_{x \to 1} \frac{3x^2}{2x} = \lim_{x \to 1} \frac{3x}{2} = \frac{3}{2}$$

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

AH: no tiene $\lim_{x \to \pm\infty} \frac{x^3-1}{x^2-1} \underset{\frac{\infty}{\infty}}{\overset{L'H}{=}} \lim_{x \to \pm\infty} \frac{3x}{2} = \frac{\infty}{2} = \infty$

AH: $\boxed{y=x}$

$$m = \lim_{x \to \pm\infty} \frac{x^3-1}{x^3-x} \underset{\frac{\infty}{\infty}}{\overset{L'H}{=}} \lim_{x \to \pm\infty} \frac{3x^2}{3x^2-1} \underset{\frac{\infty}{\infty}}{\overset{L'H}{=}} \lim_{x \to \pm\infty} \frac{6x}{6x} = 1$$

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

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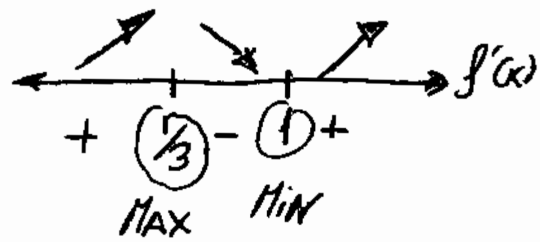
4.- $f(x) = 2x^3 - 4x^2 + 2x + 15$

4.1) $\mathrm{Dom}\, f(x) = \mathbb{R}$.

$f'(x) = 6x^2 - 8x + 2 = 0 \rightarrow 3x^2 - 4x + 1 = 0$

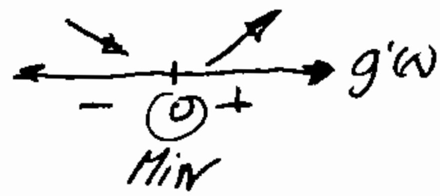
$x = \frac{4 \pm \sqrt{16-12}}{6} = \frac{4 \pm 2}{6} < \begin{matrix} x = 1 \\ x = 1/3 \end{matrix}$



4.2) $g(x) = (x-1)e^x$

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

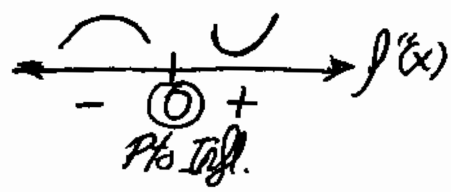
$g'(x) = e^x + (x-1)e^x = xe^x = 0 \rightarrow x = 0$



5.- $f(x) = x^3 - 1$

5.1) $\mathrm{Dom}\, f(x) = \mathbb{R}$.

$f'(x) = 3x^2 \rightarrow f''(x) = 6x = 0 \rightarrow x = 0$

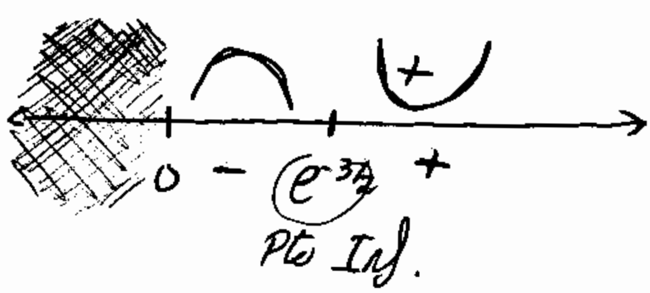


5.2) $g(x) = x^2 \ln x$

$\mathrm{Dom}\, g(x) = (0, \infty)$

$g'(x) = 2x \ln x + x$

$g''(x) = 2\ln x + 2 + 1 = 0 \rightarrow \ln x = -3/2 \rightarrow x = e^{-3/2}$ Pto Inf.



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6.- $x+y=48 \longrightarrow y=48-x$

max $x^3y \longrightarrow f(x)=x^3(48-x)=48x^3-x^4$

$\text{Dom} f(x)=\mathbb{R} \longrightarrow$ con sentido $x\in[0,48]$

$f'(x)=144x^2-4x^3=0 \longrightarrow 4x^2(36-x)=0 \begin{cases} x=0 \\ \boxed{x=36} \end{cases}$

$+ \quad 0 \quad + \quad 36 \quad -$

max

Si $x=36 \longrightarrow y=48-36$

$\boxed{y=12}$