Exame Fulla. xau - 15. Parte de Cálculo.

a) Recta entre $(\frac{1}{3},0)$, $(3,1)$: $\frac{x-1/3}{3-1/3} = \frac{y-0}{1-0}$; $y = \frac{3}{8}\left(x-\frac{1}{3}\right)$

Recta por $(\frac{1}{3},0)$ con pendente $-\frac{3}{8}$: $y = -\frac{3}{8}\left(x-\frac{1}{3}\right)$

Corte co eixo OY : $y = -\frac{3}{8}\left(0-\frac{1}{3}\right)$; $\underline{y = 1/8}$

b) $\text{sen}\left(x+\frac{5\pi}{6}\right) = \text{sen}\,x \cdot \cos\frac{5\pi}{6} + \cos x\,\text{sen}\frac{5\pi}{6} = \text{sen}\,x\cdot\left(-\cos\frac{\pi}{6}\right) + \cos x\,\text{sen}\frac{\pi}{6} =$

$= \underline{-\frac{\sqrt{3}}{2}\text{sen}\,x + \frac{1}{2}\cos x}$

c) $\lim\limits_{x\to 0^-} \frac{1}{3+2^{1/x}} = 1/3$ pues $\lim\limits_{x\to 0^-} 2^{1/x} = 2^{-\infty} = 0$.

$\lim\limits_{x\to 0^+} \frac{1}{3+2^{1/x}} = 0$ pues $\lim\limits_{x\to 0^+} 2^{1/x} = 2^{\infty} = \infty$.

O límite non existe.

d) $x^3y + xy^3 = 2$; para $x=1$, $y^3+y-2=0$;

Por Ruffini,

	1	0	1	-2
1		1	1	2
	1	1	2	0

o polinomio y^2+y+2 non ten raíces reais.

Derivando implícitamente:

$3x^2y + x^3y' + y^3 + 3xy^2y' = 0$; $y' = -\frac{3x^2y+y^3}{x^3+3xy^2}$

$y'(1,1) = -\frac{3+1}{1+3} = \underline{-1}$.

e) $y' = \frac{1}{a}\frac{1}{1+\frac{1}{a^2}\tan^2 x}\frac{1}{a}\left(1+\tan x\right) = \frac{1+\tan^2 x}{a^2+\tan^2 x} = \frac{1+\frac{\text{sen}^2 x}{\cos^2 x}}{a^2+\frac{\text{sen}^2 x}{\cos^2 x}} =$

$= \frac{\cos^2 x + \text{sen}^2 x}{a^2\cos^2 x + \text{sen}^2 x} = \underline{\frac{1}{a^2\cos^2 x + \text{sen}^2 x}}$

f) $y = \cos x$

$y' = -\operatorname{sen} x$

$y'' = -\cos x$

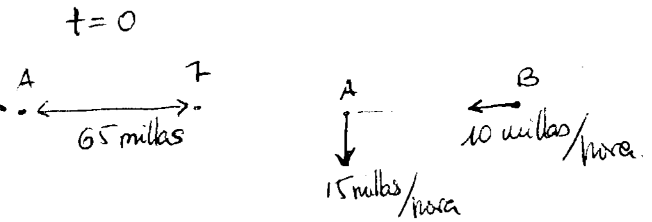
$y''' = \operatorname{sen} x$

$y^{iv} = \cos x$

$$R_4(x) = \frac{\cos x(c)}{4!}(x-0)^4$$

$$\left|R_4\left(\tfrac{1}{2}\right)\right| \leq \frac{1}{4!}\left(\frac{1}{2}\right)^4 = \frac{1}{3 \cdot 2^7}$$

EXERCICIO:



$$D(t) = d(t)^2 = (65-10t)^2 + (15t)^2$$

$$\frac{dD}{dt} = 2(65-10t)(-10) + 2 \cdot 15^2 t = 0 \; ; \; -1300 + 200t + 450t \; , \; t = \frac{1300}{650} = 2$$

Cando B pasa pola vertical de A, a distancia medra indefinidamente, logo podemos buscar o mínimo en $[0, 6.5]$, dando como resultado que se dá en $t=2$.