Clase 4 29/4

e^x

$\lim_{x \to \pm\infty} e^x = +\infty$, 0

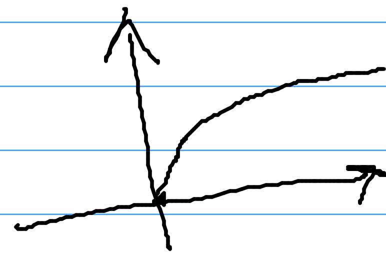
$e^0 = 1$

$e^a \cdot e^b = e^{a+b}$

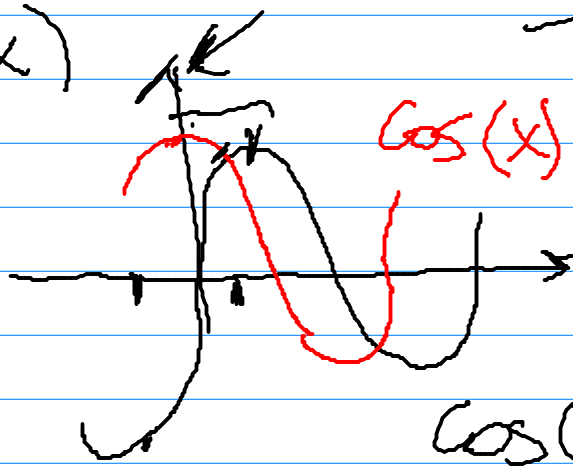
$\frac{e^a}{e^b} = e^a \cdot e^{-b} = e^{a-b}$

$(e^a)^b = e^{a \cdot b}$

$\sqrt{x}$



$\text{sen}(x)$



$f(x) = f(-x)$

$\text{sen}(-x) = -\text{sen}(x)$

$\cos(-x) = \cos(x)$

$\cos(x \pm \pi/2)$

$$\lim_{x \to +\infty} \overset{\overset{+\infty}{\uparrow}}{x} - \overset{+\infty}{\sqrt{x^2-3}} \Rightarrow +\infty - \infty$$

$$\lim_{x} \left(x - \underbrace{\sqrt{x^2-3}}_{b}\right)^2 =$$

$$(a+b)^2 = a^2 + 2a.b + b^2$$

$$1$$

$$\lim_{x} x - \sqrt{x^2-3} \cdot \left(\frac{x+\sqrt{x^2-3}}{x+\sqrt{x^2-3}}\right)$$

$$a^2 - b^2 = (a-b)(a+b)$$

$$\lim_{x} \frac{\cancel{x^2} - \cancel{x^2} + 3}{x + \sqrt{x^2-3}} = 0$$

$$\lim_{x \to 0} \frac{\operatorname{sen}(7x)}{\ln(1+x)} \Rightarrow \text{indet } \frac{0}{0}$$

$\nexists$ que decir que $x = 0$

L'Hopital $\displaystyle\lim_{x \to 0} \frac{f(x)}{g(x)} = \lim_{x \to 0} \frac{f'(x)}{g'(x)}$

$\operatorname{sen}(7x) \sim 7x \quad x \to 0$

$\ln(1+x) \sim x \quad x \to 0$

$$\sim \lim_{x \to 0} \frac{7\cancel{x}}{\cancel{x}} = 7$$

$$\lim_{x\to\infty}\left(\frac{x+2}{x-3}\right)^{2x+1} \Rightarrow 1^{\infty} \text{ indet}$$

$$\Rightarrow \left[\frac{\cancel{x}\left(1+\frac{2}{x}\right)}{\cancel{x}\left(1-\frac{3}{x}\right)}\right]^{2x+1} \quad \frac{2}{x}\to 0, \ \frac{3}{x}\to 0$$

$$\lim_{x} f(x)^{g(x)} = e^{\lim_{x} g(x)(f(x)-1)}$$

$$\lim_{x}\left(\ldots\right)^{2x+1} = e^{10}$$

$$f(x) = \frac{x+2}{x-3} \qquad g(x) = 2x+1$$

$$\lim_{x}(2x+1)\left(\frac{x+2}{x-3}-1\right)$$

$$\left(\frac{\cancel{x}+2-\cancel{x}+3}{x-3}\right) = \frac{5}{x-3}$$

$$\lim_{x}(2x+1)\cdot\frac{5}{x-3} = \lim_{x}\frac{10x+5}{x-3} = 10$$

$$\Rightarrow \lim\left(\ldots\right)^{2x+1} = e^{10}$$

$$\lim_{x} \frac{e^{x}+5}{x^{40}-2} \to \infty \Rightarrow \text{Comparación órdenes}$$

$$a_n x^n + a_{n-1} x^{n-1} + \dots + a_0$$

$$x^2 + \dots$$

$$\text{orden } \ln x < \text{orden } x^n < \text{orden } e^x$$

$$\lim_{x\to\infty} \underbrace{e^{-x}}_{\to 0} \underbrace{x^{60}}_{\to \infty} = \lim_{x} \frac{x^{60}}{e^{x}} = 0$$

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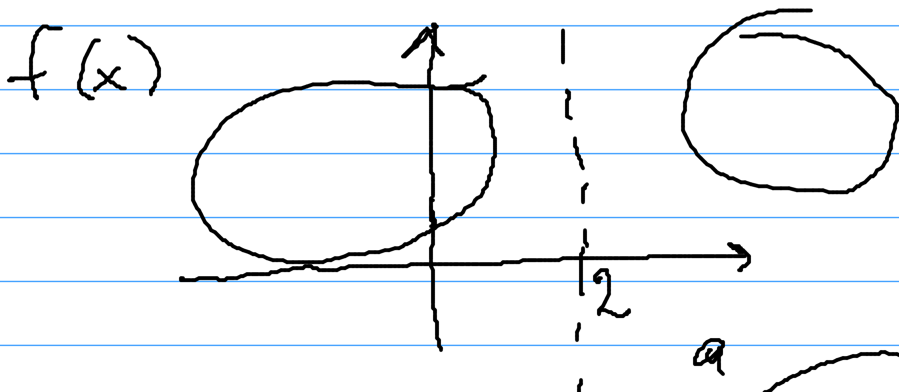
$$f(x) = \begin{cases} x-2, & x \geq 2 \\ 3x+1, & x < 2 \end{cases}$$

$(f+g)(x)$

$$g(x) = \begin{cases} x^2, & x \geq 2 \\ x^2-7, & x < 2 \end{cases}$$

a) $\exists \lim_{x \to 2} f(x) \iff \exists \lim_{x \to 2^+} f(x) = \lim_{x \to 2^-} g(x)$



H $\exists \lim_{x \to \infty} h(x) = b$ T

14) f) $\boxed{\lim_{x \to \pi/2} (1+\cos x)^{3\sec(x)}}$

a) $\lim_{x \to 0} \frac{\sin x}{\operatorname{tg} x} \Rightarrow 0/0$

$\operatorname{ctg}^2(x) = \frac{1}{\operatorname{tg}^2(x)}$

$\Rightarrow 1^{\infty}$

$$e^{\lim_{x \to \pi/2} 3\sec(x)\left(\overbrace{\cos(x)}^{f(x)-1}\right)}$$

$$\operatorname{tg}(x) = \frac{\sin(x)}{\cos(x)}$$

e) $3^{x-1} + 3^{x-2} = 12$ $\quad + |x|$ $\quad x > 0 \quad x$

$\rightarrow 3^x \cdot 3^{-1} + 3^x \cdot 3^{-2} = 12$ $\quad x < 0 \quad -x$

CV $\quad z = 3^x$

$z = 3^{x-1} \Rightarrow 3^{x-2} = 3^{x-1} \cdot 3^{-1}$ $\quad z$

5g) $\rightarrow |1-x| + |2+3x| \geq 8,1$

$\rightarrow \left[\underbrace{|2x-3| > - |2-3x|}_{\Uparrow} \right] \quad \frac{||}{||} = |-|$

6 $\quad \frac{|\cdots|}{a + |\cdots|} = \frac{|\cdots|}{|a + \cdots|} = \left| \frac{\cdots}{\cdots} \right|$?