Cálculo 1
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Parcial #1

1) $\lim_{x \to 2} \frac{x^3-8}{x-2} = 12 \to \lim_{x \to 2} \frac{\cancel{(x-2)}(x^2+2x+4)}{\cancel{x-2}} = \lim_{x \to 2} x^2+2x+4$

$= (2)^2+2(2)+4 = 4+4+4 = 12$

2) $\lim_{x \to 0} \frac{x}{|x|} = \lim_{x \to 0^+} \frac{x}{|x|} = \frac{0.1}{|0.1|} = \frac{0}{0} = \infty$

$\lim_{x \to 0^-} \frac{-0.99}{|-0.99|} = \frac{-0.99}{0.99} = \frac{-0}{0} = -\infty$

$\lim_{x \to 0} \frac{x}{|x|}$ = no existe

5) $\lim_{z \to 1} \frac{z^3+8z-2}{z^2+9z-10} = \nexists \to \lim_{z \to 1^+} \frac{z^3+8z-2}{z^2+9z-10} = \frac{(1.1)^3+8(1.1)-2}{(1.1)^2+9(1.1)-10} = \frac{1+8-2}{1+9-10} = \frac{7}{0} = \infty$

$\lim_{z \to 1^-} \frac{z^3+8z-2}{z^2+9z-10} = \frac{(0.9)^3+8(0.9)-2}{(0.9)^2+9(0.9)-10} = \frac{1+8-2}{1+9-10} = \frac{7}{0} = \infty \to$ existe

8) $\lim_{x \to 2} (3x^2-4x) = 4 = (3(2)^2-4(2)) = 3(4)-8 = 12-8 = 4$

9) $f(x) = \frac{x^2-4}{x-2}$ $x-2=0 \to x=2$

11) Si $\lim_{x \to 2} g(x) = -2 \to \lim_{x \to 2} \sqrt{g(x)^2+12} = (-2)^2+12 = \sqrt{4+12} = \sqrt{16} = 4$

13) $\lim_{x \to 9} \frac{(x+1)^2}{2x^2} =$ no es una función constante.
Y no se aproxima a nada.

14) $\lim_{x \to \infty} \sqrt{x^2-x}-x = \sqrt{x^2-x}-x \cdot \frac{\sqrt{x^2-x}+x}{\sqrt{x^2-x}+x} = \frac{x^2-x-x^2}{\sqrt{x^2-x}+x} = \frac{-x}{\sqrt{x^2-x}+x} = \frac{-x}{\sqrt{x^2}-\sqrt{x}+x}$

$= \frac{-x}{x-\sqrt{x}+x} = \frac{\frac{-x}{x}}{\frac{x}{x}-\frac{x^{1/2}}{x}+\frac{x}{x}} = \frac{-1}{1-\frac{1}{\cancel{x^{1/2}}}+1} = \frac{-1}{2}$

15) $\lim_{x \to 0} \frac{x}{1-\sqrt{1+x}} = \frac{x}{1-\sqrt{1+x}} \cdot \frac{1+\sqrt{1+x}}{1+\sqrt{1+x}} = \frac{\cancel{x}(1+\sqrt{1+x})}{1-1-x} = \frac{\cancel{x}(1+\sqrt{1+x})}{\cancel{-x}}$

$= -(1+\sqrt{1+x}) = -1+\sqrt{1+0} = -1-\sqrt{1} = -1-1 = -2$

16) $\lim_{x \to -1} \frac{x^3+1}{x+1} = \lim_{x \to -1} \frac{\cancel{(x+1)}(x^2-x+1)}{\cancel{x+1}} = x^2-x+1 = (-1)^2-(-1)+1 = 1+1+1 = 3$

18) $f(x) = \frac{x^2}{x+2}$

A.V $= x=-2$

A.H $=$ no tiene

A.O $= y = x-2$

$x=-2$

$\lim_{x \to -2^+} \frac{x^2}{x+2} = \frac{(-1.99)^2}{-1.99+2} = \frac{4}{0} = \infty$

$\lim_{x \to -2^-} \frac{(-2.1)^2}{-2.1+2} = \frac{4}{-0} = -\infty$

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

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

A.O $= m = \lim_{x \to \infty} \frac{f(x)}{x}$

$= \lim_{x \to \infty} \frac{\frac{x^2}{x+2}}{x} \rightarrow \frac{x^2}{x^2+2x} = \frac{\cancel{\frac{x^2}{x^2}}}{\cancel{\frac{x^2}{x^2}}+\cancel{\frac{2x}{x^2}}^{0}}$

$\frac{1}{1+0} = \frac{1}{1} = 1$

$\lim_{x \to \infty} \left[\frac{x^2}{x+2} - x\right] = \lim_{x \to \infty} \frac{\cancel{x^2-x^2}-2x}{x+2} = \frac{-2x}{x+2}$

$\rightarrow \frac{\frac{-2x}{x}}{\frac{x}{x}+\cancel{\frac{2}{x}}^{0}} = \frac{-2}{1+0} = -2$

19) $f(t) = \begin{cases} t+4 & \text{si } t \leq -4 \\ 4-t & \text{si } t > -4 \end{cases}$

$\lim_{t \to -4^+} (4-t) = 4-(-3.99) = 4+4 = 8$

$\lim_{t \to -4} f(t) =$ no existe

$\lim_{t \to -4^-} (t+4) = -4.1+4 = 0$