Limites no Infinito e limites Infinitos

1) a) $\lim\limits_{x\to\infty}\left(\dfrac{8x^2-7x}{7x^2+5}\right)=\lim\limits_{x\to\infty}\left(\dfrac{8-7/x}{7+5/x^2}\right)=\dfrac{8}{7}$

b) $\lim\limits_{x\to\infty}\left(\dfrac{4x^2+3}{2x^2-1}\right)=2$

c) $\lim\limits_{x\to\infty}\left(\dfrac{x+7}{5x^2-8}\right)=0$

d) $\lim\limits_{x\to\infty}\left(\dfrac{3x^4-7x^2+2}{2x^4+1}\right)=\dfrac{3}{2}$

e) $\lim\limits_{x\to-\infty}\left(\dfrac{5x^2-7x+3}{8x^2+5x+1}\right)=\dfrac{5}{8}$

f) $\lim\limits_{x\to-\infty}\left(\dfrac{x^{100}+x^{99}}{x^{101}-x^{100}}\right)=\lim\limits_{x\to-\infty}\left(\dfrac{\frac{1}{x}+\frac{1}{x^2}}{1-1/x}\right)=0$

Limites Infinitos

1 b) $\lim\limits_{x\to3}\dfrac{8x}{(x-3)^2}=+\infty$

b) $\lim\limits_{x\to3}\dfrac{4x^2}{9-x^2}$

$\lim\limits_{x\to3^+}\dfrac{4x^2 \to C>0}{\underbrace{9-x^2}_{0^-}}=-\infty$ | $\lim\limits_{x\to3^-}\dfrac{\overset{C>0}{4x^2}}{\underbrace{9-x^2}_{0^+}}=+\infty$

Como $\lim\limits_{x\to3^+}f(x)\neq\lim\limits_{x\to3^-}f(x)$, logo $\lim\limits_{x\to3}\left(\dfrac{4x^2}{9-x^2}\right)$ não existe.

c) $\lim\limits_{x \to 4} \dfrac{x}{(x-4)}$ não existe

d) $\lim\limits_{x \to 0} \dfrac{\sqrt{1+x}}{x}$ não existe

e) $\lim\limits_{x \to 2^+} \dfrac{\sqrt{x^2-4}}{x-2} = \lim\limits_{x \to 2^+} \dfrac{\sqrt{(x-2).(x+2)}}{\sqrt{(x-2)^2}} =$

$= \lim\limits_{x \to 2^+} \dfrac{\cancel{\sqrt{x-2}} . \sqrt{x+2}}{\cancel{\sqrt{x-2}} . \sqrt{x-2}} = \lim\limits_{x \to 2^+} \dfrac{\overbrace{\sqrt{x+2}}^{\to 2>0}}{\underbrace{\sqrt{x-2}}_{\to 0^+}} = \infty$

f) $\lim\limits_{x \to 0^+} \dfrac{\overbrace{\sqrt{4+3x^2}}^{\to 2>0}}{\underbrace{5x}_{\to 0^+}} = \infty$

g) $\lim\limits_{x \to \infty} (5x^2 - 3x) = \infty$

h) $\lim\limits_{x \to -1^+} \left(\underbrace{\dfrac{\overset{c>0}{3}}{\underset{\to 0^+}{(x+1)}}}_{\infty} + \underbrace{\dfrac{\overset{c<0}{-5}}{\underset{\to 0^-}{x^2-1}}}_{\infty} \right) = \infty$

i) $\lim\limits_{x \to \infty} \left(\sqrt{x^2+2x} - x\right) = \lim\limits_{x \to \infty} \left(\sqrt{x^2+2x} - x\right) . \dfrac{\left(\sqrt{x^2+2x} + x\right)}{\left(\sqrt{x^2+2x} + x\right)} =$

$= \lim\limits_{x \to \infty} \left(\dfrac{\cancel{\sqrt{x^2+2x}}^{\,2} - x^2}{\sqrt{x^2+2x} + x} \right) = \lim\limits_{x \to \infty} \dfrac{2x}{\sqrt{x^2+2x} + x} =$

$= \lim\limits_{x \to \infty} \left(\dfrac{2x/x}{\dfrac{\sqrt{x^2+2x} + x}{x}} \right) = \lim\limits_{x \to \infty} \dfrac{2}{\sqrt{\dfrac{x^2+2x}{x^2}} + 1} =$

$= \lim\limits_{x \to \infty} \dfrac{2}{\sqrt{1 + 2/x} + 1} = \dfrac{2}{1+1} = 1$

j) $\lim\limits_{x \to \infty} \dfrac{2x - x^2}{3x+5} = \lim\limits_{x \to \infty} \dfrac{\frac{2}{x} - 1}{3/x + 5/x^2} = -\infty$

$\rightarrow -1 < 0$

$\rightarrow 0^+$

k) $\lim\limits_{x \to \infty} \dfrac{x^2}{x+1} = \infty$

l) $\lim\limits_{x \to \infty} \dfrac{7x^3 - 15x^2}{13x} = \infty$