Σvf

Límits de funcions

$\lim_{x\to+\infty} f(x)$ $\qquad$ $\lim_{x\to-\infty} f(x) = \lim_{x\to+\infty} f(-x)$

$\frac{\infty}{\infty}$

$$\lim_{x\to+\infty} \frac{a_n x^n + \cdots + a_0}{b_m x^m + \cdots + b_0} = \begin{cases} [\pm]\infty & si\ n > m \\ 0 & si\ m > n \\ \frac{a_n}{b_m} & si\ n = m \end{cases}$$

$$\lim_{x\to+\infty} \frac{\sqrt[p]{a_n x^n + \cdots + a_0}}{\sqrt[q]{b_m x^m + \cdots + b_0}} = \begin{cases} [\pm]\infty & si\ \frac{n}{p} > \frac{m}{q} \\ 0 & si\ \frac{m}{q} > \frac{n}{p} \\ \frac{\sqrt[p]{a_n}}{\sqrt[q]{b_m}} & si\ \frac{n}{p} = \frac{m}{q} \end{cases}$$

$\infty - \infty$

$$\lim_{x\to+\infty} \left[\frac{P(x)}{Q(x)} - \frac{R(x)}{T(x)}\right] = \lim_{x\to+\infty} \left[\frac{P(x)T(x) - R(x)Q(x)}{Q(x)T(x)}\right]$$

$$\lim_{x\to+\infty} \left[\sqrt{P(x)} - \sqrt{Q(x)}\right] = \lim_{x\to+\infty} \left[\frac{P(x) - Q(x)}{\sqrt{P(x)} + \sqrt{Q(x)}}\right]$$

1^∞

$$\lim_{x\to+\infty} \left[1 + \frac{1}{x}\right]^x = e$$

$$Si\ \lim_{x\to+\infty} P(x) = \infty \longrightarrow \lim_{x\to+\infty} \left[1 + \frac{1}{P(x)}\right]^{P(x)} = e$$

$$Si\ \lim_{x\to+\infty} \left[\frac{P(x)}{Q(x)}\right] = 1\ \ i\ \ \lim_{x\to+\infty} R(x) = \infty \longrightarrow \lim_{x\to+\infty} \left[\frac{P(x)}{Q(x)}\right]^{R(x)} = e^{\lim_{x\to+\infty}\left[\frac{P(x)}{Q(x)} - 1\right]\cdot R(x)}$$

Treball amb ∞

$k + \infty = \infty$
$k - \infty = -\infty$
$k \cdot \infty = \infty\ si\ k > 0$
$k \cdot \infty = -\infty\ si\ k < 0$
$\frac{k}{\infty} = 0$

$\infty + \infty = \infty$
$\infty \cdot \infty = \infty$
$k^\infty = \infty, si\ k > 1$
$k^\infty = 0, si\ 0 < k < 1$
$k^{-\infty} = 0, si\ k > 1$
$k^{-\infty} = \infty, si\ 0 < k < 1$

$$\lim_{x\to+\infty} \left[\frac{k^x}{x^n}\right] = [\pm]\infty, \qquad k > 1\ i\ n \in N$$

$$\lim_{x\to+\infty} \left[\frac{Ln(x)}{x^n}\right] = 0, \qquad n \in N$$

$\lim_{x\to a} f(x)$, $a \in R$ és punt d'acumulació de $D(f)$

Si $P(x)$ és un polinomi $\rightarrow \lim_{x\to a} P(x) = P(a)$

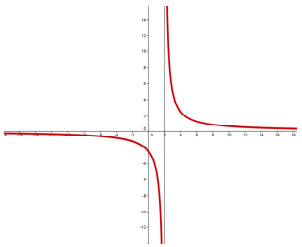
$\frac{0}{0}$

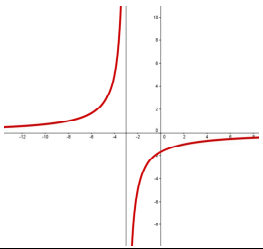
$$\lim_{x\to a} \frac{P(x)}{Q(x)} = \lim_{x\to a} \frac{(x-a)\cdot p(x)}{(x-a)\cdot q(x)} = \lim_{x\to a} \frac{p(x)}{q(x)}$$

$$\lim_{x\to a} \frac{P(x)}{\sqrt{Q(x)} - \sqrt{R(x)}} = \lim_{x\to a} \frac{P(x)\cdot\left(\sqrt{Q(x)} + \sqrt{R(x)}\right)}{Q(x) - R(x)}$$

$\frac{k}{0}$ on $k \in R^*$, límits laterals

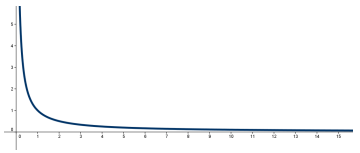
$$\lim_{x\to a} \frac{P(x)}{(x-a)} = \begin{cases} \lim_{x\to a^-} \frac{P(x)}{(x-a)} = [\pm\infty] \\ \lim_{x\to a^+} \frac{P(x)}{(x-a)} = [\pm\infty] \end{cases}$$



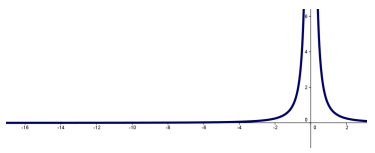


Gràficament

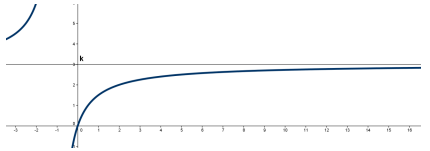
$\lim_{x\to+\infty} f(x) = 0$



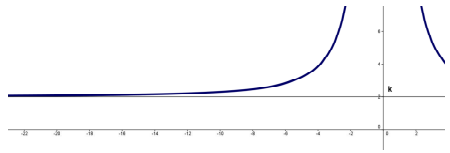
$\lim_{x\to-\infty} f(x) = 0$



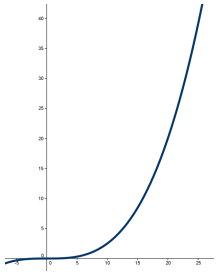
$\lim_{x\to+\infty} f(x) = k$



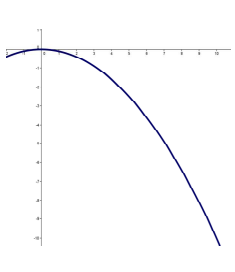
$\lim_{x\to-\infty} f(x) = k$



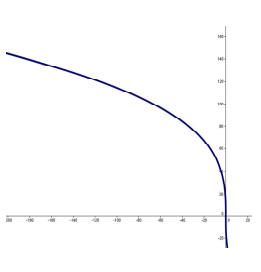
$\lim_{x\to+\infty} f(x) = +\infty$



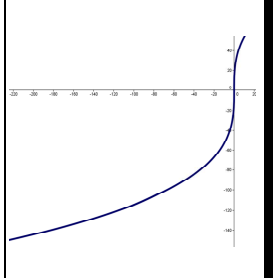
$\lim_{x\to+\infty} f(x) = -\infty$



$\lim_{x\to-\infty} f(x) = +\infty$



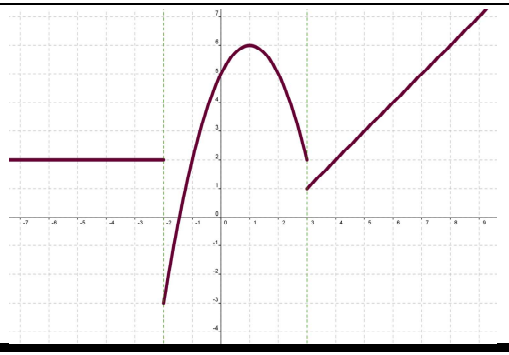
$\lim_{x\to-\infty} f(x) = -\infty$



Funcions definides a trossos. Límits laterals

$$f(x) = \begin{cases} g(x) si\ x \le x_0 \\ h(x) si\ x > x_0 \end{cases} \qquad \lim_{x\to x_0^-} f(x) = \lim_{x\to x_0} g(x) = l_1 \qquad \lim_{x\to x_0^+} f(x) = \lim_{x\to x_0} h(x) = l_2$$

$$Si\ l_1 = l_2 = l \in R \rightarrow \lim_{x\to x_0} f(x) = l$$



$\lim_{x\to(-2)^-} f(x) = 2$

$\lim_{x\to(-2)^+} f(x) = -3$

$\lim_{x\to 3^-} f(x) = 2$

$\lim_{x\to 3^+} f(x) = 1$

Indeterminacions

$\frac{\infty}{\infty}$	$\infty - \infty$	$\frac{0}{0}$
$0 \cdot \infty$	∞^0	0^0
	1^∞	