① $\lim_{x\to+\infty} (e^x - x^2 + 1) = e^{+\infty} - \infty^2 + 1 = +\infty - \infty + 1 = +\infty$

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

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

$\lim_{x\to+\infty} \frac{x^3 - 1 - x^3 - 2x^3}{x^3+2x^2+x+2} = \frac{-\infty}{+\infty} = \frac{-2}{1} = -2$

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$\lim_{x\to 2} \frac{2x^2+x-10}{x^3-3x^2+4} = \frac{8+2-10}{8-12+4} = \frac{0}{0}$ (Ind)

$x = \frac{-1 \pm 9}{4} \begin{cases} 2 \\ -5/2 \end{cases}$

	1	−3	0	4
2	1	2	−2	−4
	1	−1	−2	0

$x = \frac{1 \pm 3}{2} \begin{cases} 2 \\ -1 \end{cases}$

$\lim_{x\to 2} \frac{2(x-2)(x+5/2)}{(x-2)^2(x+1)} = \frac{9}{0}$

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

$\lim_{x\to 2^+} f(x) = \frac{9}{0^+} = +\infty$

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$\lim_{x\to 1} \left(\frac{2x+4}{x^2-x+6}\right)^{\frac{3x}{x-1}} = \left(\frac{6}{6}\right)^{1/0} = 1^{1/0}$ (Ind)

$e^{\lim_{x\to 1} \frac{3x}{x-1}\left(\frac{2x+4}{x^2-x+6} - 1\right)}$

$e^{\lim_{x\to 1} \frac{3x}{x-1} \frac{2x+4-x^2+x-6}{x^2-x+6}}$

$e^{\lim_{x\to 1} \frac{3x}{x-1} \frac{-x^2+3x-2}{x^2-x+6}} = e^{\frac{3\cdot 0}{0.6}} = e^0$

$e^{\lim_{x\to 1} \frac{3x(x-1)(x-2)}{(x-1)(x^2-x+6)}} e^{\lim_{x\to 1} \frac{-3(1)}{6}} = e^{-1/2}$

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$\lim_{x\to-\infty} \left(\frac{2-3x}{-2x+1}\right)^{-x/2} = \left(\frac{+\infty}{-\infty}\right)^{\infty} = \left(\frac{3}{2}\right)^{\infty} = +\infty$

$\lim_{x\to 0} \frac{x \sin x}{x^3+3x^2} = \frac{0}{0}$ (Ind) $\approx \lim_{x\to 0} \frac{x \cdot x}{x^3+3x^2} = \frac{0}{0}$

$\lim_{x\to 0} \frac{x^2}{x^2(x+3)} = \frac{1}{3}$

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$\lim_{x\to 0} \frac{4-4\cos x}{x^2} = \frac{0}{0}$

$\lim_{x\to 0} \frac{4(1-\cos x)}{x^2} \approx \lim_{x\to 0} \frac{4\cdot x^2/2}{x^2} = 2$

$1-\cos x \underset{x\to 0}{\sim} \frac{x^2}{2}$

$\lim_{x\to 0} \frac{\operatorname{sen} x + 2x}{x} = \frac{0}{0}$ (Pendiente)

$\operatorname{sen}(x-1) \underset{x\to 1}{\sim} (x-1)$ ($x-1 \to 0$)

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$2^{3/0}$

$\lim_{x\to 1} (x+1)^{\frac{3}{x-1}} = 2^{3/0}$

$\lim_{x\to 1^-} f(x) = 2^{\frac{3}{0^-}} = 2^{-\infty} = 0$ (A)

$\lim_{x\to 1^+} f(x) = 2^{\frac{3}{0^+}} = 2^{+\infty} = +\infty$

$\lim_{x\to 1} (x+1)^{\frac{3}{(x-1)^2}} = 2^{3/0}$

$\lim_{x\to 1^-} f(x) = 2^{\frac{3}{0^+}} = 2^{+\infty} = +\infty$

$\lim_{x\to 1^+} f(x) = 2^{\frac{3}{0^+}} = 2^{+\infty} = +\infty$

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ASINTOTAS

A.V $\lim_{x\to a} f(x) = \pm\infty$

$x=a$

Cocientes, Log: $f(x) = \frac{P(x)}{Q(x)}$ $Q(x)=0$ $x=a$ lim lat.

$f(x) = \log_a P(x)$ $P(x)=0$ $x=a$ lim lat.

A.H $y=a$ $\lim_{x\to\pm\infty} f(x) = a$

Cocientes, Exp: $\lim_{x\to\pm\infty} \frac{P(x)}{Q(x)}$ Grado $Q(x) \geq$ Grado Num

Exp $\lim_{x\to\pm\infty} a^{f(x)}$ $2^{+\infty} = +\infty$ ∄ A.H

$2^{-\infty} = 0$ ∃ A.H

A.O $y = mx+n$ $m = \lim_{x\to\infty} \frac{f(x)}{x} \in \mathbb{R}-\{0\}$

$n = \lim_{x\to\infty} [f(x) - mx]$

Cocientes, Raices: $f(\pm\infty)$ Asint$(\pm\infty)$

Cocientes: $m = \lim_{x\to\infty} \frac{\frac{P(x)}{Q(x)}}{x}$ Grado $P(x) >$ Grado $Q(x)$

Raices: $\lim_{x\to+\infty} \frac{\sqrt{x^2+2}}{x} = 1$

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

2 asintotas oblicuas ($\lim_{x\to+\infty}$, $\lim_{x\to-\infty}$)

Raices: $\lim_{x\to\pm\infty} f(x) = \pm\infty$

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De tarea

(1) $\lim_{x\to 0} \frac{\sqrt{2x+4}-2}{\sqrt{x+1}-1}$

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

(3) $\lim_{x\to 2} \left(\frac{3x-2}{x^2-2x+4}\right)^{\frac{x}{2-x}}$

(4) $\lim_{x\to -\infty} \left(\frac{4x^2-7}{3x^2+9x}\right)^{x}$

(5) $\lim_{x\to 1} \frac{x \cdot \operatorname{tg}(2x-1)}{x^2-1}$

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