$y=\ln(x^2-4)$

$D: x^2-4>0$ $-2$ $2$ $D=(-\infty,-2)\cup(2,\infty)$

P.C $x=0$ ∄

$y=0$ $\ln(x^2-4)=0$ $e^0=x^2-4$ $x=\pm\sqrt{5}$ $(\sqrt{5},0)(-\sqrt{5},0)$

Asint A.V $x^2-4=0$

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

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

Mont y ext $y'=\frac{2x}{x^2-4}=0$ $x=0$ Rama inf $\lim_{x\to\pm\infty} f(x)=+\infty$

$-2$ $2$ $f'(-3)$ $f'(3)$

Dec $(-\infty,-2)$

Crec $(2,+\infty)$

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Conv y PI $y''=\frac{2(x^2-4)-2x\cdot 2x}{(x^2-4)^2}=\frac{-2x^2-8}{(x^2-4)^2}$

$-2$ $2$ $f''(-3)$ $f''(3)$

Concava en $(-\infty,-2)\cup(2,\infty)$

Rep

Sim PAR

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$y=\frac{e^x}{1-x}$

$D=\mathbb{R}-\{1\}$

P.C $x=0$ $y=\frac{e^0}{1-0}=1$ $(0,1)$

$y=0$ $e^x=0$ ∄

Asint A.V $x=1$ $\lim_{x\to 1^-} f(x)=\frac{e}{0^+}=+\infty$

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

A.H $\lim_{x\to+\infty}\frac{e^x}{1-x}=\frac{+\infty}{-\infty}=-\infty$ ∄

$\lim_{x\to-\infty}\frac{e^x}{1-x}=\frac{0}{+\infty}=0$ $y=0$ $f(-100)>0$

A.O $y=mx+n$ $m=\lim_{x\to+\infty}\frac{e^x}{x-x^2}=\frac{+\infty}{-\infty}=-\infty$ ∄

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

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Mon ext $y'=\frac{e^x(1-x)+e^x}{(1-x)^2}=\frac{e^x(2-x)}{(1-x)^2}$

$1$ $1$ $2$ $f'(0)$ $f'(1.5)$ $f'(2.5)$

Crec $(-\infty,1)\cup(1,2)$

Dec $(2,\infty)$

Max $(2,f(2))=(2,e^2)$

Conv y PI $y'=$

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Curv y PI

$$y'' = \frac{[e^x(2-x)+e^x(-1)](1-x)^3 - e^x(2-x)3(1-x)(-1)}{(1-x)^6}$$

$$= \frac{e^x(1-x)^2 + e^x(4-2x)}{(1-x)^3}$$

$$= \frac{e^x(1-2x+x^2+4-2x)}{(1-x)^3}$$

$$= \frac{e^x(x^2-4x+5)}{(1-x)^3} \sim 0 \qquad x = \frac{4 \pm \sqrt{16-20}}{2} \notin$$

(+) 0 1 f''(2)

f''(0)

Concava $(1,\infty)$

Convexa $(-\infty,1)$

$\exists$ PI

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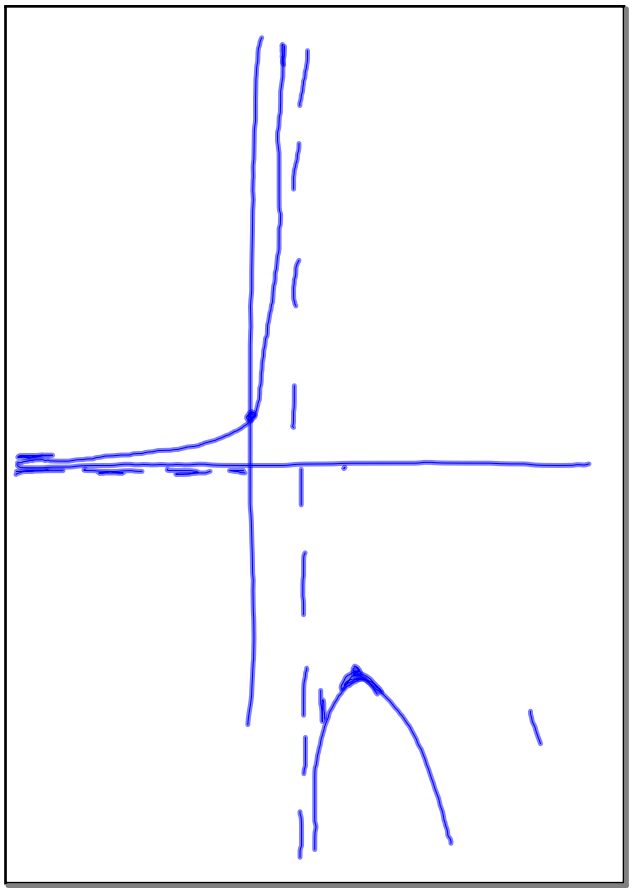

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$$y = \frac{\ln(x+1)}{x-2}$$

D: $x+1>0 \quad x>-1$

$x-2 \neq 0$

-1 2 $D=(-1,\infty)-\{2\}$

P.C $x=0 \quad y=0$ $\boxed{(0,0)}$

Asint AV $\boxed{x=2}$ $\lim_{x\to 2^-} f(x) = \frac{\ln 3}{0^-} = -\infty$

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

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

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

$\boxed{y=0}$ $f(100)>0$

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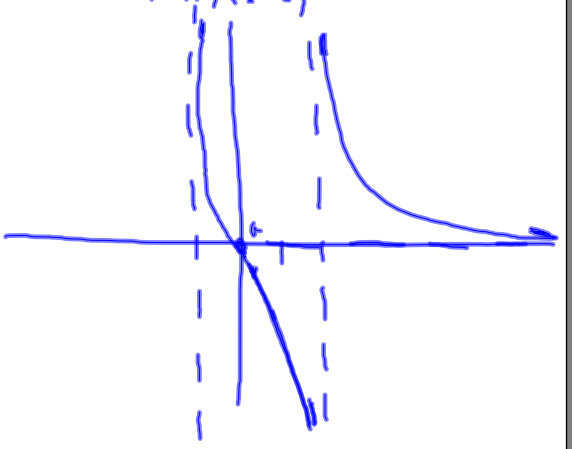
Monot y ext

$$y' = \frac{\frac{1}{x+1}(x-2) - \ln(x+1)\,1}{(x-2)^2}$$

$$y' = \frac{(x-2)-(x+1)\ln(x+1)}{(x+1)(x-2)^2}$$



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Monot $Dec(-1,2)\cup(2,\infty)$

Conv $Convexe(-1,a)\cup(2,\infty)$

$Concava(a,2)$

$PI(a,f(a))$

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$y=\frac{1}{2}\operatorname{sen}2x+\operatorname{sen}x$

$D=\mathbb{R}$

$P:\ 0\le 2x\le 360^\circ \quad 0\le x<180^\circ$
$\quad 0\le x\le 360^\circ \quad 0\le x\le 360$ $\Big]\ P=360^\circ$

P.C $x=0$ $y=\frac{1}{2}\operatorname{sen}0+\operatorname{sen}0=0$ $(0,0)$

$y=0$ $\frac{1}{2}\operatorname{sen}2x+\operatorname{sen}x=0$

$\frac{1}{\cancel{2}}\cancel{2}\operatorname{sen}x\cos x+\operatorname{sen}x=0$

$\operatorname{sen}x(\cos x+1)=0$ $\begin{cases}\operatorname{sen}x=0\\ \cos x=-1\end{cases}$

$\boxed{x=0^\circ+180^\circ k}$

$x=0^\circ$

$x=180^\circ$

Monot y ext. $y'=\frac{1}{2}\cos 2x\cdot 2+\cos x$

$\boxed{y'=\cos 2x+\cos x}=0$

$\cos^2x-\operatorname{sen}^2x+\cos x=0$

$\cos^2x-(1-\cos^2x)+\cos x=0$

$2\cos^2x+\cos x-1=0$ $\cos x=\frac{-1\pm 3}{4}$ $\begin{cases}1/2\\ -1\end{cases}$

$x=60^\circ+120^\circ k$

$x=60^\circ$

$x=180^\circ$

$x=300^\circ$

$+ \quad - \quad - \quad +$

$0 \quad 60^\circ \quad 180^\circ \quad 300^\circ \quad 360^\circ$

$f'(30) \quad f'(90) \quad f'(270^\circ) \quad f'(330^\circ)$

$Crec\ [0^\circ,60^\circ)\cup(300^\circ+360^\circ]$

$Dec\ (60^\circ,300^\circ)$

$Max\ (60^\circ,1'3)$

$Min\ (300^\circ,-1'3)$

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Conv y PI

$y''=-2\operatorname{sen}2x-\operatorname{sen}x=0$

$-2\cdot 2\operatorname{sen}x\cos x-\operatorname{sen}x=0$

$\operatorname{sen}x(-4\cos x-1)=0$

$\operatorname{sen}x=0$ $x=0^\circ,\ x=180^\circ$

$\cos x=-1/4$ $\begin{cases}104^\circ 28'39''\\ 255^\circ 31'20'9''\end{cases}$

$+ \quad - \quad + \quad - \quad + \quad -$

$0 \quad 104^\circ \quad 180^\circ \quad 255^\circ \quad 360$

$f'(90) \quad f'(135^\circ) \quad f'(200^\circ) \quad f'(270^\circ)$

$Concava\ (0,104^\circ)\cup(180^\circ,255^\circ)$

$Convexe\ (104^\circ,180^\circ)\cup(255^\circ,360^\circ)$

$PI\ (0,0)$

$(104^\circ,0'74)$

$(180^\circ,0)$

$(255,-0'72)$

$(360^\circ,0)$

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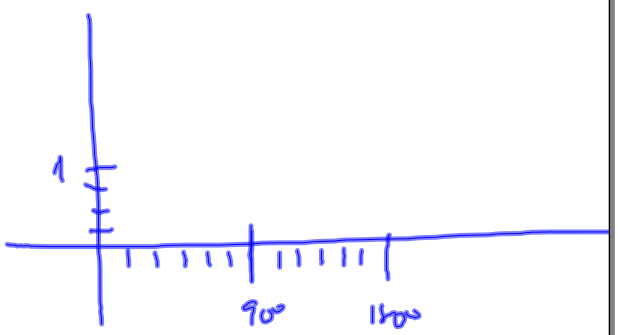
Representar




$y=\frac{1}{1+|x|}$ $\begin{cases}\frac{1}{1+x} & x\ge 0\\ \frac{1}{1-x} & x<0\end{cases}$

$y=\frac{x^2+2x}{e^x}$

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