Etude de fonction

$$f(x) = \frac{x^2+2}{1-x^2}$$

1. Domaine de definition

Dom $f = \mathbb{R} \setminus \{-1,1\}$

2. Signe de f

x		-1		1	
$\frac{x^2+2}{1-x^2}$	$-$	$\|$	$+$	$\|$	$-$

3. Limites et asymptotes

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

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

AV $\equiv x = -1$

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

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

AV $\equiv x = 1$

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

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

AH $\equiv x = -1$

4. Intersection avec les axes

Gf $\cap$ X = { }

Gf $\cap$ Y = { (0,2) }

5. Etude de f'

$$f'(x) = \frac{6x}{(x^2-1)^2}$$

x		-1		0		1	
$\frac{6x}{(x^2-1)^2}$	$-$	$\|$	$-$	0	$+$	$\|$	$+$

Min : (0,2)

6. Etude de f''

$$f''(x) = -\frac{6(3x^2+1)}{(x^2-1)^3}$$

x		−1		1	
$-\frac{6\left(3x^2+1\right)}{\left(x^2-1\right)^3}$	−	|	+	|	−

7. Tableau recapitulatif

x	$-\infty$		−1		0		1		∞
f (x)	−1	−	|	+	2	+	|	−	−1
	x = −1				Min				x = −1
pente	0	−	|	−	0	+	|	+	0
concavite	0	−	|	+	6	+	|	−	0

8. Graphe de f

Out[7]=