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

1. $D = \mathbb{R}^*$

2. $f(-x) = \dfrac{\ln((-x)^2+1)}{2\cdot(-x)} = \dfrac{\ln(x^2)+1}{-2x} \neq f(x) \Rightarrow$ pas paire

$-f(-x) = -\dfrac{\ln(x^2)+1}{-2x} = \dfrac{\ln(x^2)+1}{2x} = f(x) \Rightarrow$ <u>impaire</u>

3. $f(x) = 0 \Rightarrow \ln(x^2)+1 = 0$

$\Rightarrow \ln(x^2) = -1 \quad | e^{()}$

$\Rightarrow \underbrace{e^{\ln(x^2)}}_{x^2} = e^{-1}$

$x^2 = \dfrac{1}{e} \Rightarrow x = \pm\sqrt{\dfrac{1}{e}} \cong \pm 0{,}61$

x		$-0{,}61$		0		$0{,}61$	
$\ln(x^2)+1$	$+$	0	$-$		$-$	0	$+$
$2x$	$-$	$-$	$-$		$+$	$+$	$+$
$f(x)$	$-$	0	$+$		$-$	0	$+$

4. A.V en $x = 0$, car $\dfrac{\text{"}\neq 0\text{"}}{\text{"}=0\text{"}}$

5. A.A.

$\boxed{+\infty}$ $\quad m = \lim\limits_{x\to+\infty} \dfrac{f(x)}{x} = \lim\limits_{x\to+\infty} \dfrac{\ln(x^2)+1}{2x^2} \underset{\text{l'H}}{=} \lim\limits_{x\to+\infty} \dfrac{\frac{1}{x^2}\cdot 2x}{4x} =$

$= \lim\limits_{x\to+\infty} \dfrac{2}{4x^2} = 0$

$h = \lim\limits_{x\to+\infty} (f(x) - mx) = \lim\limits_{x\to+\infty} \dfrac{\ln(x^2)+1}{2x} \underset{\text{l'H}}{=} \lim\limits_{x\to+\infty} \dfrac{\frac{1}{x^2}\cdot \cancel{2}x}{\cancel{2}}$

$= \lim\limits_{x\to+\infty} \dfrac{1}{x} = 0$

$\Rightarrow$ A.A : $\boxed{y = 0}$

$\boxed{-\infty}$ idem, car f est impaire.

6. $f(x) = \dfrac{\ln(x^2)+1}{2x}$

$$f'(x) = \frac{\frac{1}{\cancel{x^2}} \cdot 2\cancel{x} \cdot 2\cancel{x} - (\ln(x^2)+1)\cdot 2}{4x^2} = \frac{\overset{2}{\cancel{4}} - 2\ln(x^2) \cancel{-2}}{4x^2}$$

$$= \underline{\underline{\frac{1-\ln(x^2)}{2x^2}}} = 0 \Rightarrow \ln(x^2) = 1 \Rightarrow \underbrace{e^{\ln(x^2)}}_{x^2} = e^1$$

$$\Rightarrow x = \pm\sqrt{e} = \pm 1{,}65$$

x		$-1{,}65$		0		$1{,}65$	
$1-\ln(x^2)$	$-$	0	$+$		$+$	0	$-$
$2x^2$	$+$	$+$	$+$		$+$	$+$	$+$
$f'(x)$	$-$	0	$+$		$+$	0	$-$
$f(x)$	$\searrow$	$-0{,}61$	$\nearrow$		$\nearrow$	$0{,}61$	$\searrow$
		min				max	

7. $$f''(x) = \frac{-\frac{1}{\cancel{x^2}} \cdot 2x \cdot 2\cancel{x^2} - (1-\ln(x^2))\cdot 4x}{4x^4} = \frac{-\cancel{4}x - \cancel{4}x + \cancel{4}x\ln(x^2)}{\cancel{4}x^4}$$

$$= \frac{-2\cancel{x} + \cancel{x}\ln(x^2)}{x^{\cancel{4}3}} = \underline{\underline{\frac{\ln(x^2)-2}{x^3}}} = 0$$

$$\Rightarrow \ln(x^2) = 2 \Rightarrow x^2 = e^2 \Rightarrow x = \pm e = \pm 2{,}72$$

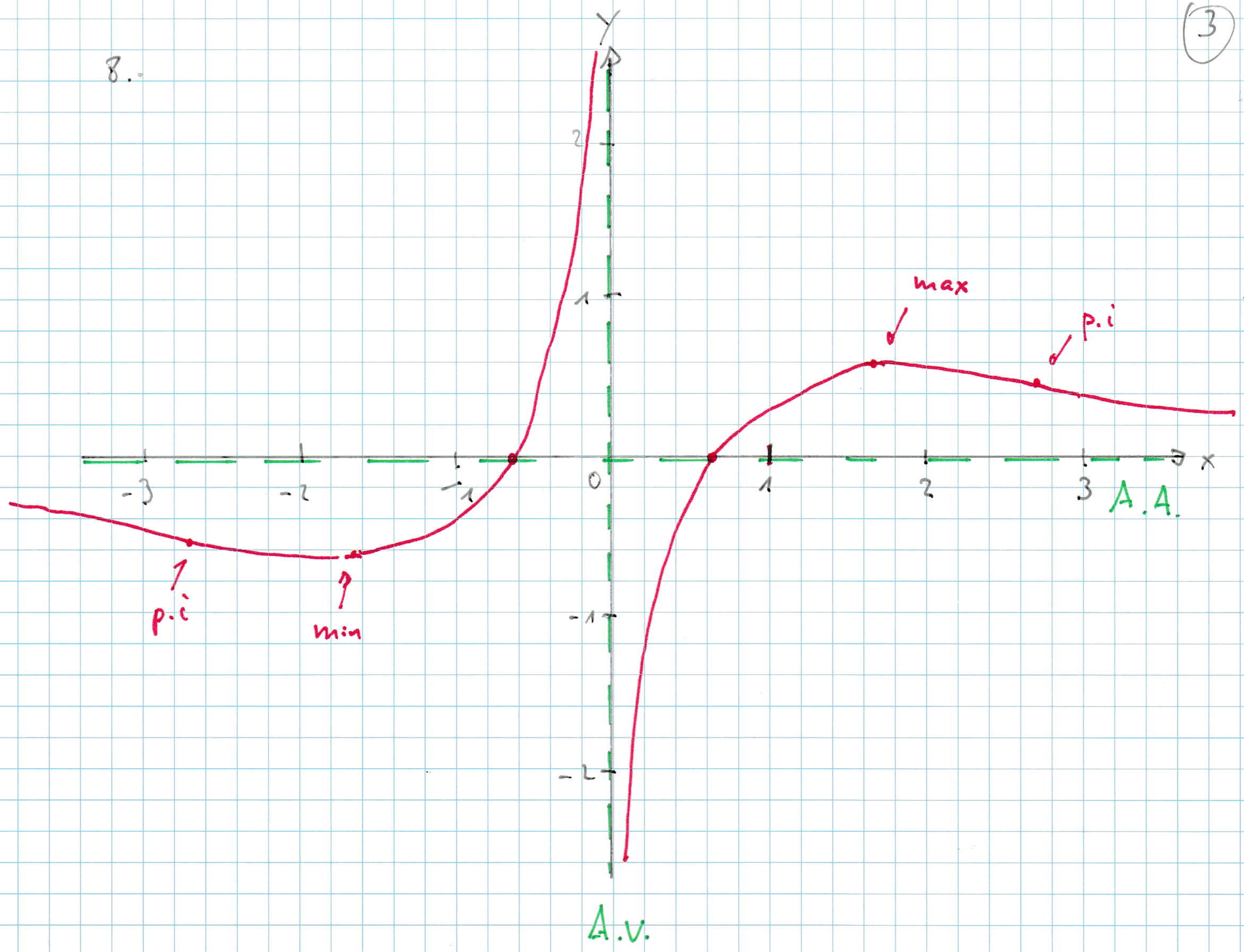
x		$-2{,}72$		0		$2{,}72$	
$\ln(x^2)-2$	$+$	0	$-$		$-$	0	$+$
x^3	$-$	$-$	$-$		$+$	$+$	$+$
$f''(x)$	$-$	0	$+$		$-$	0	$+$
$f(x)$	$\cap$	$-0{,}55$	$\cup$		$\cap$	$0{,}55$	$\cup$
		p.i				p.i	

$\dfrac{3}{2e}$

$$f'(e) = \frac{-1}{2e^2} = -0{,}067$$

$$f'(-e) = f'(e) = -0{,}067$$

8.



Ce sera plus joli avec DESMOS