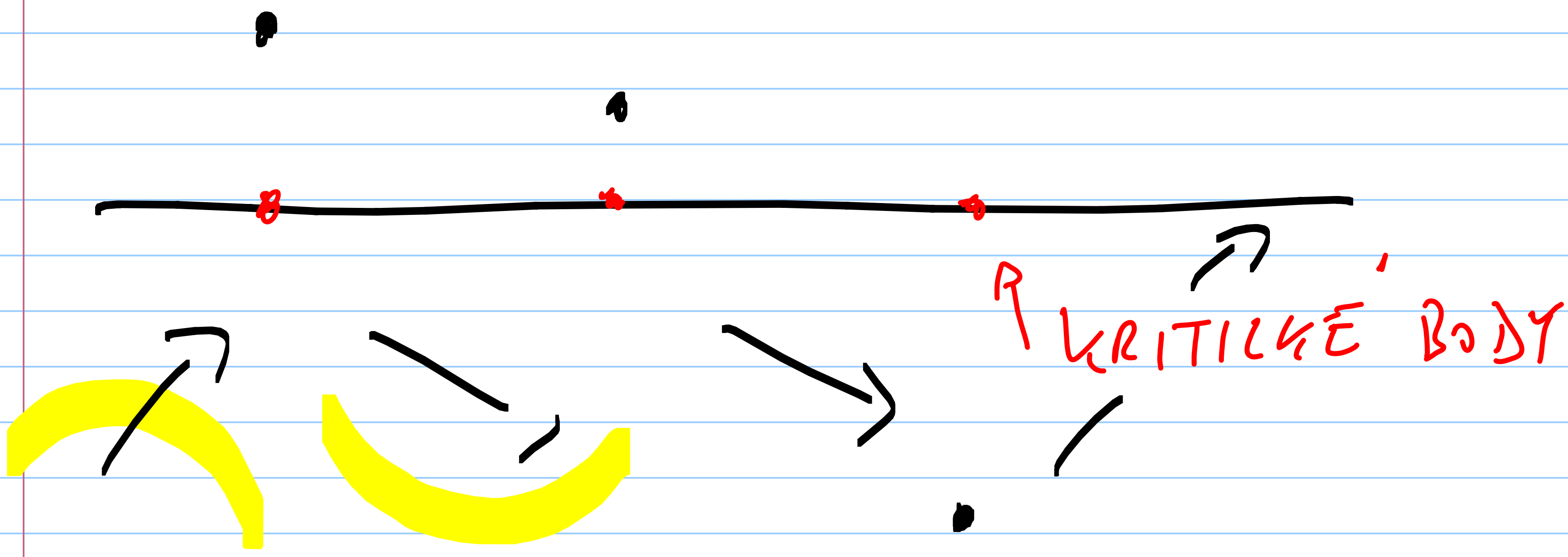
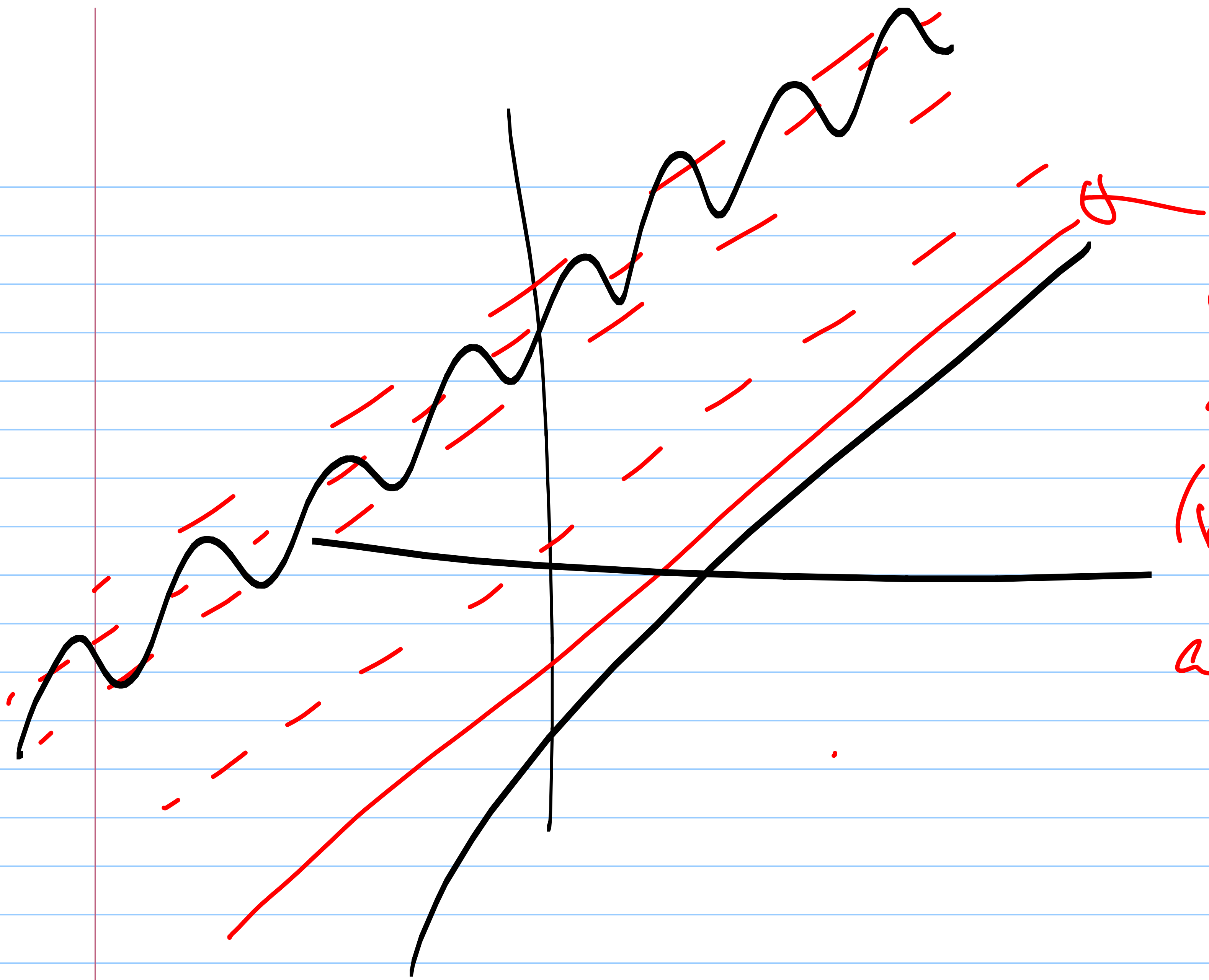
Nový nadpis 20.3.2013

$f(x) =$





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

$$\lim_{x \to \infty} e^{-1/x^2} \cdot x^{-1} = 0$$

$$\downarrow \qquad \downarrow$$

$$1 \qquad 0$$

$$\lim_{x \to \infty} \left(e^{-1/x^2} - 0 \cdot x \right) = 1$$

$$f(x) = \frac{x}{\ln(x)}$$

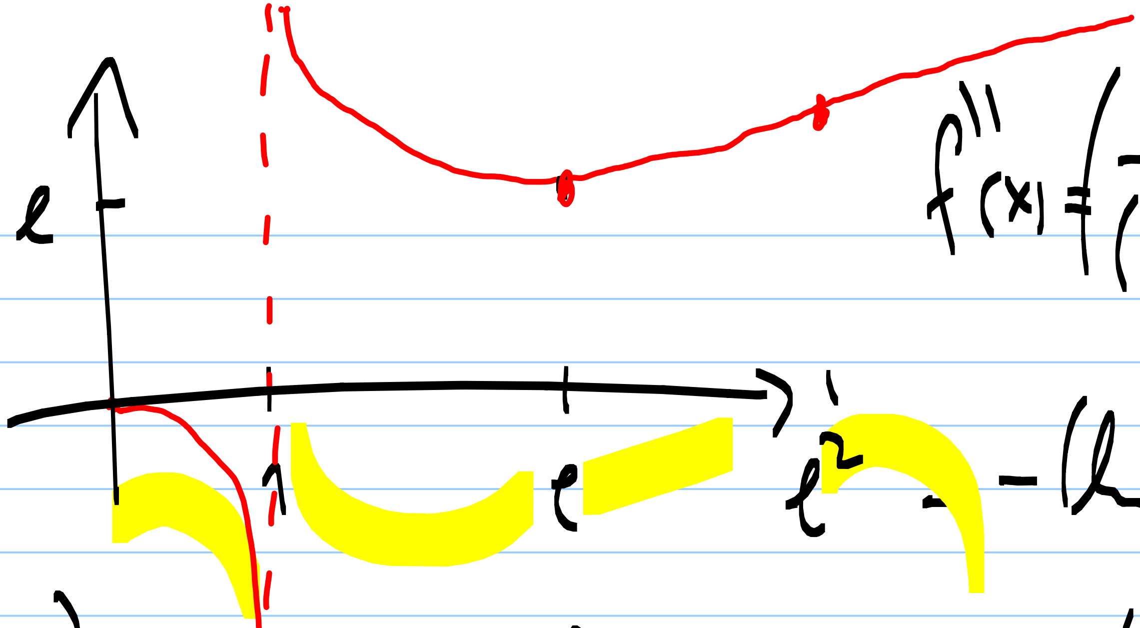
1) def. dom : $\mathbb{R}^+ \setminus \{1\}$

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

$f'(x) = 0 \iff x = e$

in $(0,1)$ è $f'(x) < 0$ $\quad$ (e, ∞) è $f'(x) > 0$

$(1,e)$ — " —



f' <0 <0 0 >0

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

$$-(\ln x)^{-2} \cdot \frac{1}{x}$$

$$+2(\ln x)^{-3} \cdot \frac{1}{x}$$

$$= \frac{-\ln x + 2}{x(\ln x)^3}$$

$$f''(e) = \frac{-1+2}{e} > 0$$ minimum

$$f''(x) = 0 \implies \boxed{x = e^2}$$

$f''(x) > 0$ na $(1, e^2)$ [illegible]

asymptoty:

1) $$\lim_{x\to\infty} \frac{\frac{x}{\ln(x)}}{x} = \lim \frac{1}{\ln x} = 0$$

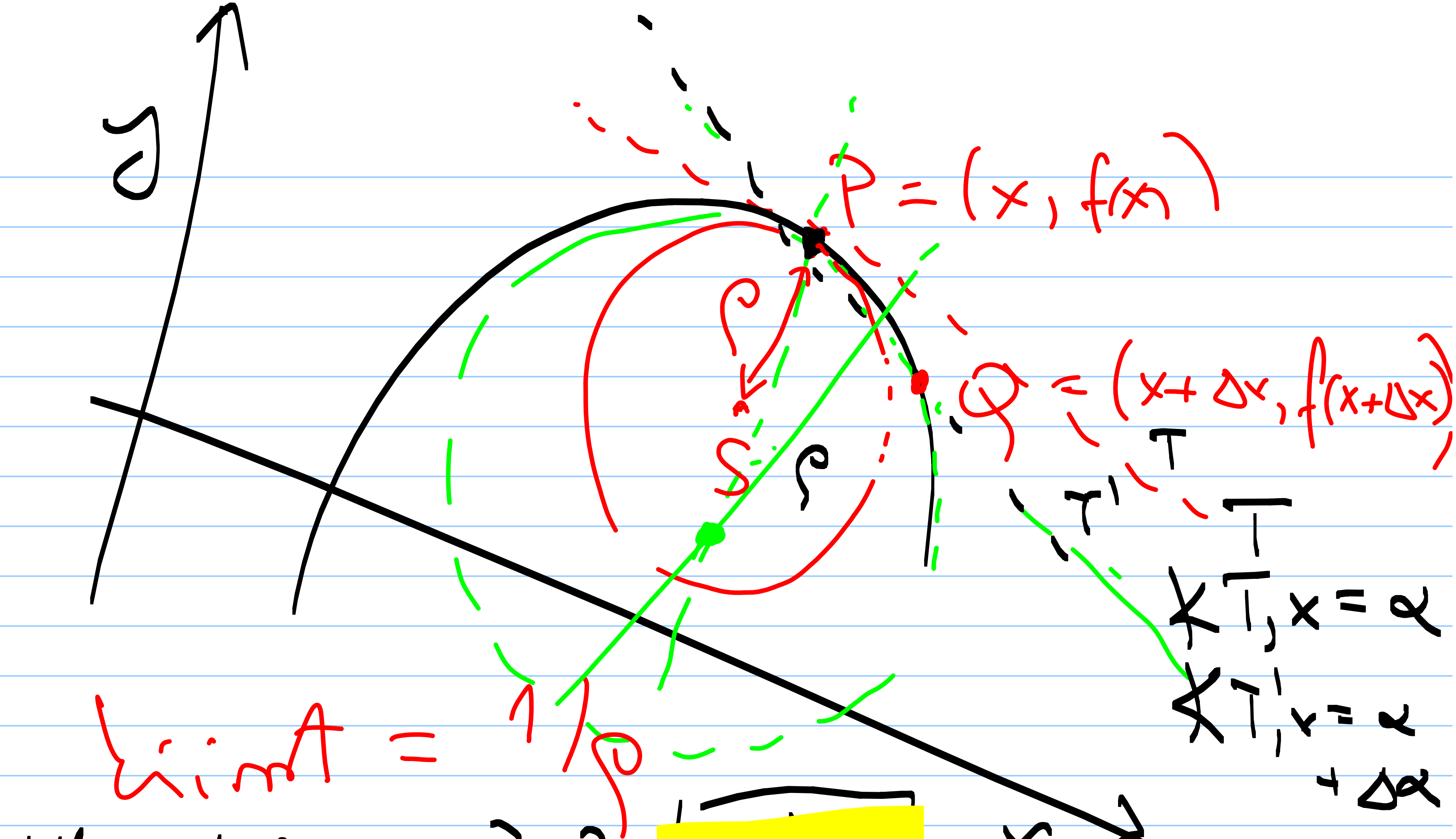
2) $$\lim_{x\to\infty}\left(\frac{x}{\ln x} - 0\cdot x\right) = \lim_{x\to\infty} x = \infty$$

↑ l'Hospital

& není NE

$$\lim_{x\to 1_-} \frac{x}{\ln x} = -\infty \qquad \lim_{x\to 1_+} \frac{x}{\ln x} = +\infty$$

$$\lim_{x\to 0_+} \frac{x}{\ln x} = 0$$



dille Abl. von P u. Q — Δα

dille gerad f(x) von P u. Q — S

$$\rho = \lim_{\Delta\alpha \to 0} \frac{\Delta s}{\Delta \alpha} = \frac{ds}{d\alpha}$$

nemine Naw

$$\operatorname{tg} \alpha = \frac{df}{dx} \Rightarrow f''(x) = \frac{d\alpha}{dx} \cdot \frac{1}{(\cos\alpha)^2}$$

$$\frac{1}{\cos^2\alpha} = 1 + (\operatorname{tg}\alpha)^2 = 1 + (f')^2 \Rightarrow \frac{dx}{d\alpha} = \frac{1+(\operatorname{tg}\alpha)^2}{f''} = \frac{1+(f')^2}{f''}$$

$$\frac{ds}{dx} = \sqrt{1+(f')^2}$$

$$\rho = \frac{ds}{d\alpha} = \frac{ds}{dx} \cdot \frac{dx}{d\alpha} = \frac{(1+(f')^2)^{3/2}}{f''}$$