$y' = 0$ → MASSIMO
→ MINIMO
→ FLESSO

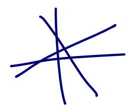
p 1716

$$\left.\begin{array}{l} f(x) \text{ definita } [a;b] \\ f(x) \text{ derivabile } (a;b) \\ x_0 \in (a;b) : x_0 \text{ pto max, min} \end{array}\right\} f'(x_0) = 0$$

È SUFFICIENTE? No, potrebbe essere anche un FLESSO $f'(x_0) = 0 \neq$ min, max

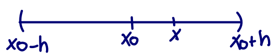
$f'(x_0) = 0$

$f(x)$ é DERIVATA $x_0 \iff f'(x_0) = \lim_{h \to 0} \frac{f(x_0-h) + f(x_0)}{h}$



dim.

hp. x_0 é pt max:
$\forall x \in I_{x_0} \quad f(x) \leq f(x_0)$



$f(x_0+h) \leq f(x_0)$
$f(x_0+h) - f(x_0) \leq 0$

se $h > 0 \quad \frac{f(x_0+h) - f(x_0)}{h} \leq 0$

$h < 0 \quad \frac{f(x_0+h) - f(x_0)}{h} \geq 0$

$x \to x_0$?

$h>0$
$$\lim_{h \to 0} \frac{f(x_0+h) - f(x_0)}{h} = f'_-(x_0) \geq 0$$
$h<0$
$$\lim_{h \to 0} \frac{f(x_0+h) - f(x_0)}{h} = f'_+(x_0) \leq 0$$

→ hp. $f(x)$ é DERIVABILE in x_0
↳ $f'_-(x_0) = f'_+(x_0) = 0$ → $f'(x_0) = 0$

Se $f(x)$ in x_0 NON è derivabile?

$y = |x^2 - 9|$

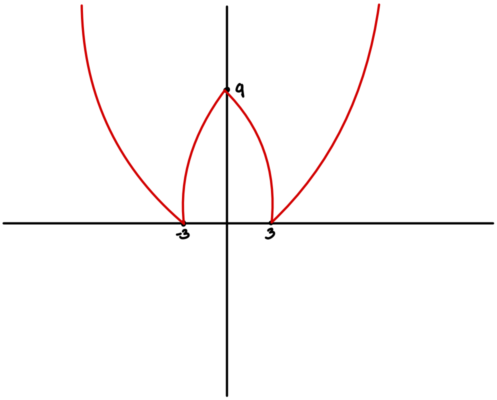
è CONTINUA

$\lim_{x \to 3} |x^2 - 9| = 0$

(è PARI $3^+ = 3^-$)

$f(3) = 0$

$\hookrightarrow f(x)$ è CONTINUA



1° METODO se è derivabile $x = 3$

$$y \begin{cases} x^2 - 9 & x^2 - 9 \geq 0 \quad x \leq 3 \vee x \geq 3 \\ -x^2 + 9 & x^2 - 9 < 0 \quad -3 \leq x \leq 3 \end{cases}$$

$$y' \begin{cases} 2x & x \leq -3 \vee x \geq 3 \\ -2x & -3 < x < 3 \end{cases}$$

se C.E $f(x) \neq$ C.E $f'(x)$

$\hookrightarrow$ pt di NON DERIVABILITÀ

$f'_-(3) = -2(3) = -6$

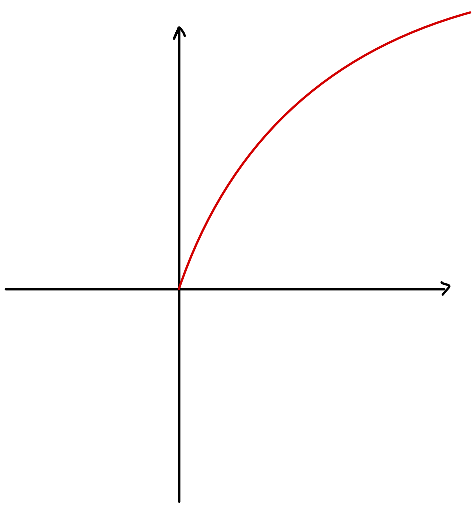
$f'_+(3) = 2(3) = +6$

$f'_- \neq f'_+$

$x = 3$ NON è derivabile $\to$ pt ANGOLOSO

$y = \sqrt{x}$

$y' = \frac{1}{2x}$

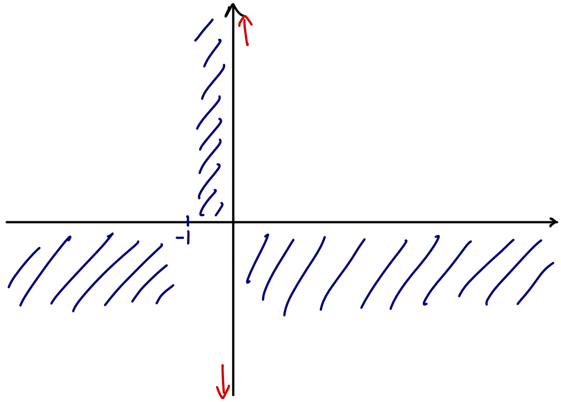


$\boxed{P173}$

p174 5 n° 279

$y = x^2 + \frac{1}{x}$ C.E $x \neq 0$

$= \frac{x^3+1}{x}$ $x \in (-\infty; 0) \cup (0; +\infty)$



PARI o DISPARI?

$f(-x) \neq f(x)$
$-f(-x) \neq f(x)$ } nessuno dei due

$\lim_{x \to \infty} f(x) = +\infty$ NO ORIZZONTALI

NO OBLIQUI

$\lim_{x \to 0^+} = +\infty$ $x = 0$ AS VERTICALE

$\lim_{x \to 0^-} = -\infty$

ZERI

$x^3+1=0$ $x=1$ $A(-1;0)$

$x^2 + \frac{1}{x} > 0 \rightarrow x^2 > -1/x$

$\rightarrow \frac{x^3+1}{x}$

	-1		0	
−		+		+
−		−		+
+		−		+

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

$y' = 0$ $x = \frac{1}{\sqrt[3]{2}} \simeq 0{,}7$

$2x^3 - 1 > 0$

$x > 1/\sqrt[3]{2}$?

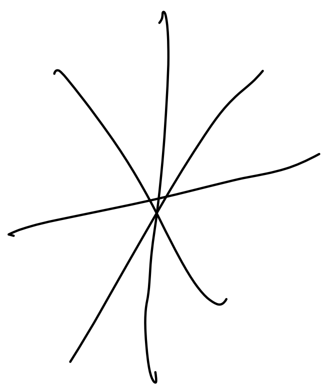
n° 282 p174 5

$f(x)$ SIMMETRICA $y = 2$

p1748 n° 333

$y = \frac{ax^2 - b}{x^2 + b}$ $y = 1$ As Orizz

flesso $x = \frac{2}{3}\sqrt{3}$



$y' = \frac{2ax^3 + 2abx - 2ax^3 + 2bx}{x^4 + 2bx^2 + b^2}$