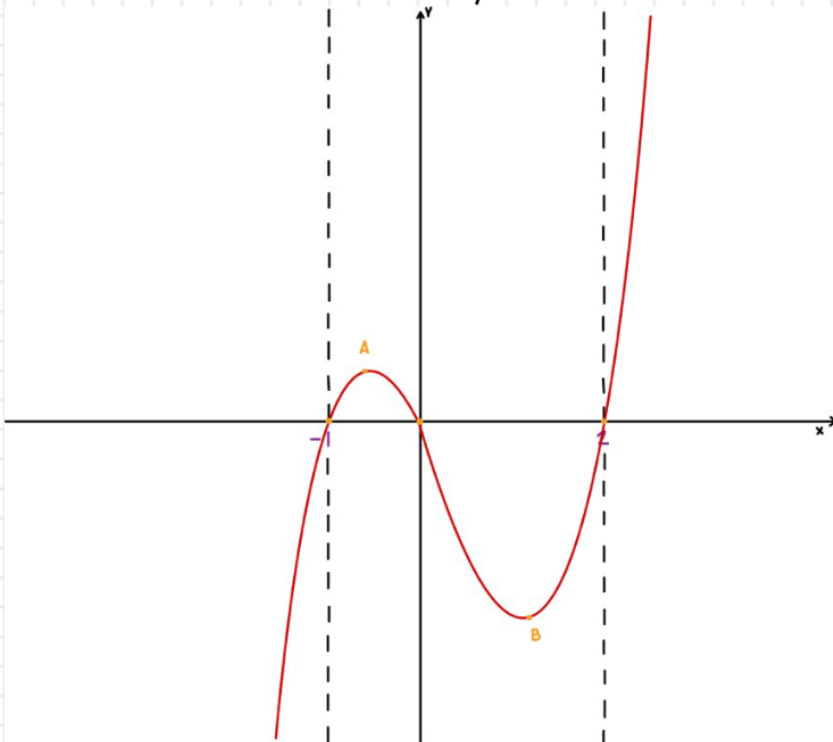


Def: x_0 pt STAZIONARIO $u = f(x)$ definitum $[a; b]$
 def: $f'(x_0) = 0$ $x_0 \in (a; b)$
 $\hookrightarrow m = 0$

Dimostrare x_0 stazionario $\nrightarrow x_0$ max, min



$$y = x^3 - x^2 - 2x$$

$$C \in \mathbb{R}$$

ZERI

$$x(x^2 - x - 2) = 0$$

$$\begin{array}{l} x=0 \quad (0;0) \\ x=-1 \quad (-1;0) \\ x=2 \quad (2;0) \end{array}$$

SEGNO

$$x(x^2 - x - 2) > 0$$

$$\begin{array}{ccccccc} -1 & 0 & 2 & & & & \\ - & - & 0 & + & + & & \\ + & 0 & - & - & 0 & + & \\ & - & 0 & + & 0 & - & 0 & + \end{array}$$

$$f'(x) = 3x^2 - 2x - 2$$

se $m > 0$ (crescente)
 se $m < 0$ (decrescente)

$$f'(x) = 3x^2 - 2x - 2$$

$$f'(x) = 0 \text{ (punto stazionario)}$$

$$3x^2 - 2x - 2 = 0$$

$$x = \frac{1 \pm \sqrt{7}}{3} \rightarrow \begin{array}{l} \frac{1 - \sqrt{7}}{3} \approx -0.5 \\ \frac{1 + \sqrt{7}}{3} \approx 1.2 \end{array}$$

$$A \left(\frac{1 - \sqrt{7}}{3}; 0.6 \right) \text{ MAX}$$

$$B \left(\frac{1 + \sqrt{7}}{3}; -2.1 \right) \text{ MIN}$$

PUNTO FLESSO

$$f''(x) = 0 \rightarrow \text{punto FLESSO}$$

Studio il segno \rightarrow trovo concavità

$$f'(x) > 0 \text{ SEGNO funzione}$$

$$\frac{1 - \sqrt{7}}{3} \quad \frac{1 + \sqrt{7}}{3}$$

$$x = \frac{1 - \sqrt{7}}{3} \text{ pto MAX}$$

$$x = \frac{1 + \sqrt{7}}{3} \text{ pto MIN}$$

$$y = \frac{1}{3}x^3 - 3x^2$$

c. $\in \mathbb{R}$

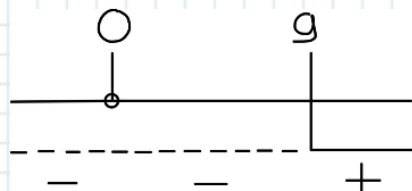
ASINTOTI NO (poni/disponi)

ZERI $y = x^3 - 9x^2 = 0$ $\begin{matrix} x=0 \\ x=9 \end{matrix} \rightarrow$ pt **DOPPIO** \cup \cap $\begin{matrix} \text{concava} \\ \text{verso BASSO} \end{matrix}$ o $\begin{matrix} \text{convessa} \end{matrix}$

SEGNO

$$x^2(x-9) > 0$$

$$\begin{matrix} x^2 > 0 \\ x > 9 \end{matrix} \begin{cases} x \neq 0 \\ x > 9 \end{cases}$$



$$f(x) < 0 \quad (-\infty; 0) \cup (0; 9)$$

$$f(x) > 0 \quad (9; +\infty)$$

$$f'(x) = x^2 - 6x$$

$$\begin{matrix} y' = 0 \\ x = 0 \\ x = 6 \end{matrix}$$

$$y' > 0$$



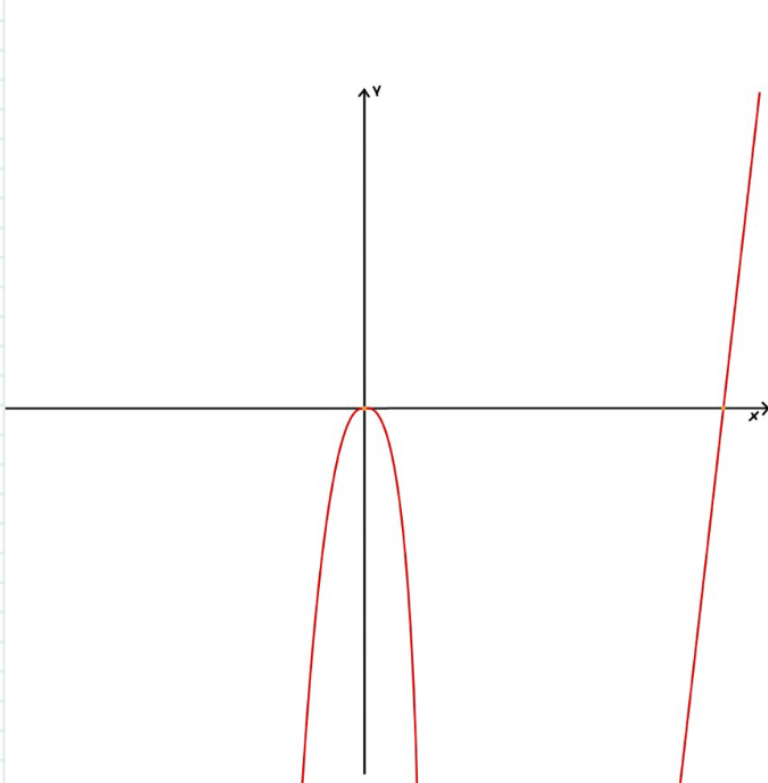
$$\begin{matrix} x=0 & \text{pt MAX} & (0; 0) \\ x=6 & \text{pt MIN} & (6; -36) \end{matrix}$$

$$f''(x) = 2x - 6$$

$$f''(x) = 0 \rightarrow x = 3 \text{ pt FLESSO}$$

$$f'' > 0 \quad x > 3 \quad (3; -8)$$

$$\begin{matrix} - & 3 & + \\ \cap & & \cup \end{matrix}$$



$$y = x^3$$

$$x^3 = 0$$

$$x = 0 \rightarrow \text{pt TRIPLO}$$

$$y' = 3x^2$$

$$y' = 0 \quad x = 0$$

$$y' > 0 \quad 3x^2 > 0 \quad [x \neq 0] \rightarrow \text{può essere}$$

- pt MAX
- pt MIN
- FLESSO

$$y'' = 6x$$

$$y'' = 0 \quad x = 0$$

$$y'' > 0 \quad x > 0$$

- 0 +
∩ ∪

pag 1736

