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? $a \in \mathbb{R}$ $\quad f(x) = \dfrac{x^2+ax+2}{x-4}$ non ammette né max né min relativi.

Dominio: $D_f = \{x \in \mathbb{R} \mid x-4 \neq 0\} = (-\infty, 4) \cup (4, +\infty)$

$$f'(x) = \frac{(2x+a)(x-4) - x^2 - ax - 2}{(x-4)^2} =$$

$$= \frac{2x^2 - 8x + \cancel{ax} - 4a - x^2 - \cancel{ax} - 2}{(x-4)^2} =$$

$$= \frac{x^2 - 8x - 4a - 2}{(x-4)^2} \geq 0$$

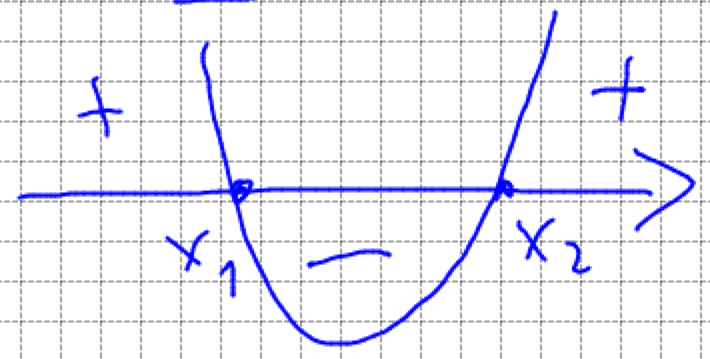
N) $x^2 - 8x - 4a - 2 \geq 0$

D) sempre $+$, $x \neq 4$

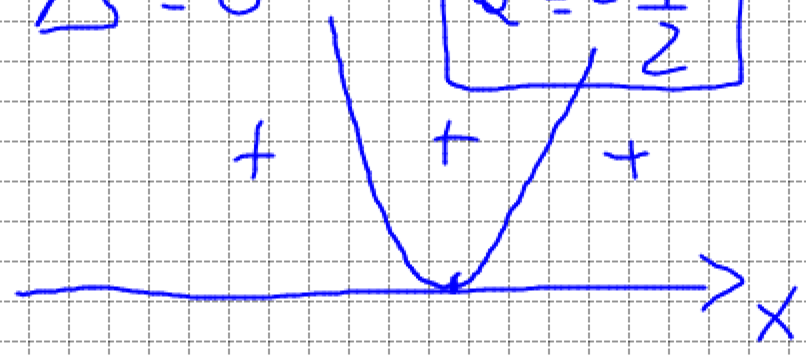
N) $\Delta > 0$ $\qquad 16 + 4a + 2 > 0$

$4a > -18$

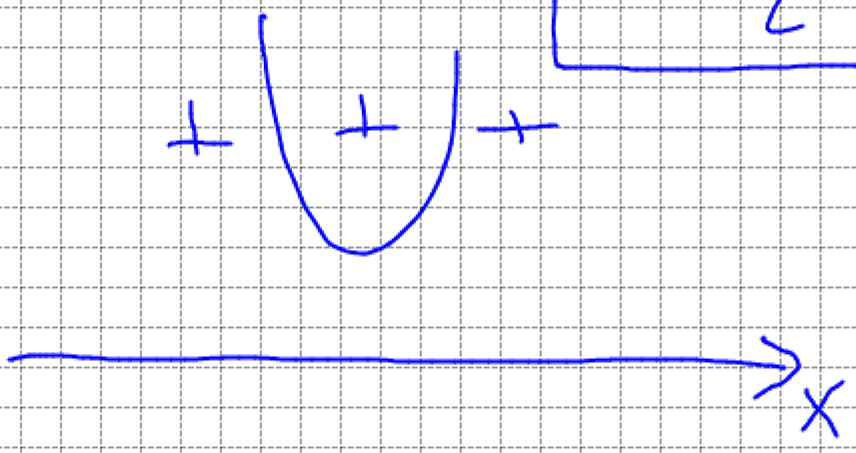
$\boxed{a > -\frac{9}{2}}$



$\Delta = 0$ $\qquad \boxed{a = -\frac{9}{2}}$



$\Delta < 0$ $\qquad \boxed{a < -\frac{9}{2}}$



Se $a = -\frac{9}{2}$ $\quad f'(x) = \dfrac{x^2 - 8x + 16}{(x-4)^2} =$

$$= \frac{(x-4)^2}{(x-4)^2} = 1$$

Se $a \leq -\frac{9}{2}$ non si hanno né max né min relativi.

N 47 PAG 313

$f(x) = x\,e^{\sqrt{x+3}}$ max e min

$D_f = \{x \in \mathbb{R} \,/\, x+3 \geq 0\} = [-3, +\infty)$

<u>Segno</u>:

$f(x)$ è positiva per $x > 0$

$f(x) = 0$ per $x = 0$

$f(x) < 0$ per $x < 0$

• max e min:

$$f'(x) = e^{\sqrt{x+3}} + x\,e^{\sqrt{x+3}}\left(\frac{1}{2\sqrt{x+3}}\right) =$$

$$= e^{\sqrt{x+3}}\left(1 + \frac{x}{2\sqrt{x+3}}\right) \geq 0$$

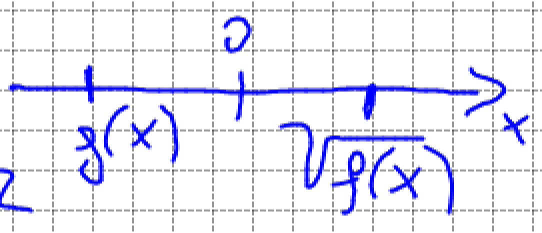
P_1: $e^{\sqrt{x+3}} \geq 0$ sempre +

P_2: $\dfrac{2\sqrt{x+3} + x}{2\sqrt{x+3}} \geq 0$

N) $2\sqrt{x+3} + x \geq 0$

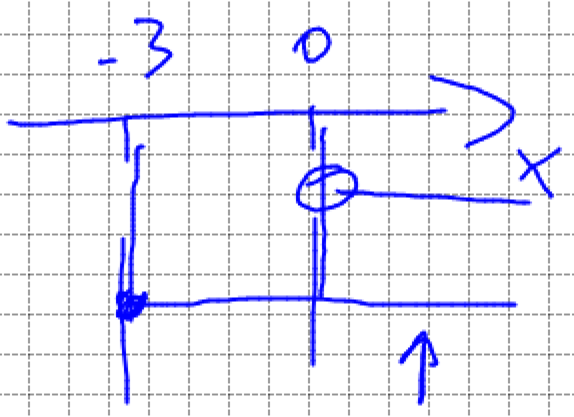
$\sqrt{x+3} \geq -\dfrac{x}{2}$ $\quad \sqrt{f(x)} \geq g(x)$

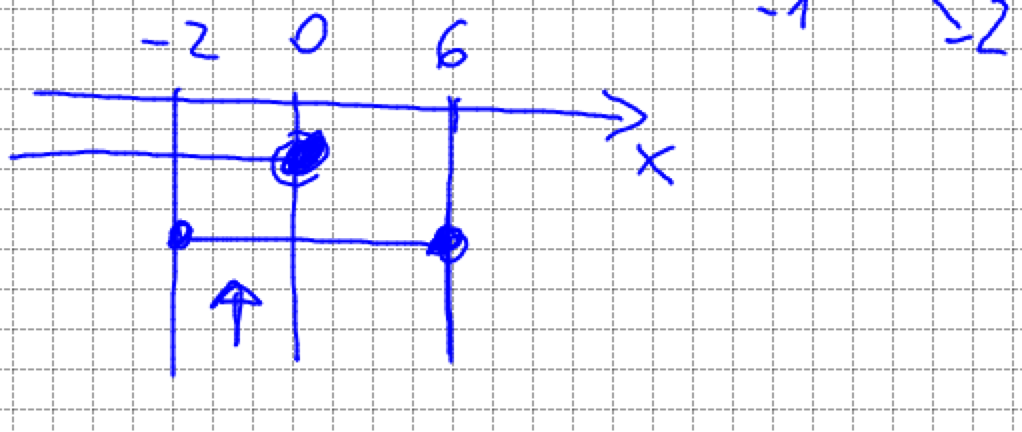
$$\begin{cases} -\frac{x}{2} < 0 \\ \sqrt{x+3} \geq 0 \end{cases} \cup \begin{cases} -\frac{x}{2} \geq 0 \\ x+3 \geq \left(-\frac{x}{2}\right)^2 \end{cases}$$



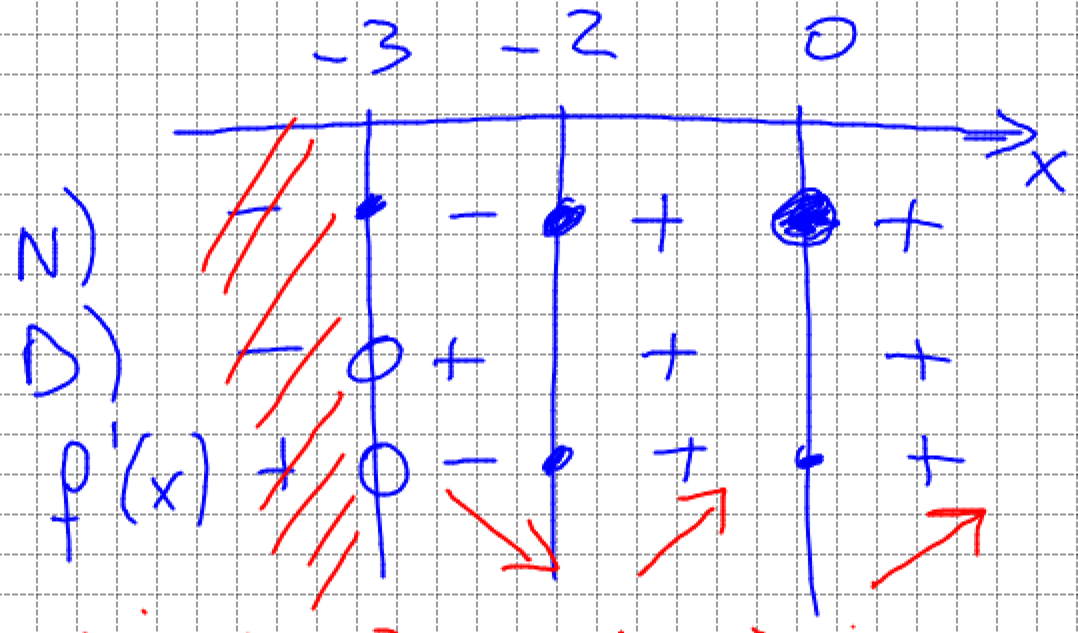
$$\begin{cases} x > 0 \\ x \geq -3 \end{cases} \cup \begin{cases} x \leq 0 \\ x+3 \geq \frac{x^2}{4} \end{cases}$$

$$\begin{cases} x > 0 \\ x \geq -3 \end{cases} \cup \begin{cases} x \leq 0 \\ -x^2 + 4x + 12 \geq 0 \end{cases} \qquad x_{1,2} = \frac{-2 \pm \sqrt{4+12}}{-1} \begin{matrix} 6 \\ -2 \end{matrix}$$





D) $2\sqrt{x+3} > 0$



min $x = -2$ $\qquad$ sup $\to +\infty$

ESERCIZIO

$$f(x) = \frac{4x^2+1}{x^2-2x+1}$$

$$D_f = \{x \in \mathbb{R} \mid x^2-2x+1 \neq 0\} = (-\infty; +1) \cup (+1; +\infty)$$

$$f'(x) = \frac{8x(x^2-2x+1)-(2x-2)(4x^2+1)}{(x^2-2x+1)^2} =$$

$$= \frac{\cancel{8x^3}-16x^2+8x-\cancel{8x^3}-2x+8x^2+2}{(x-1)^4} =$$

$$= \frac{-8x^2+6x+2}{(x-1)^4} \geq 0$$

N) $-2(4x^2-3x-1) \geq 0$

$$x_{1,2} = \frac{3\pm\sqrt{9+16}}{8} = \frac{3\pm5}{8} = \begin{cases} 1 \\ -\frac{1}{4} \end{cases}$$

D) $(x-1)^4 > 0$

		$-\frac{1}{4}$		1		x
N_1)	$-$		$-$		$-$	
N_2)	$+$	$\bullet$	$-$	$\bullet$	$+$	
D)	$+$		$+$	$\circ$	$+$	
$f'(x)$	$-$	$\bullet$	$+$		$-$	
	↘		↗		↘	