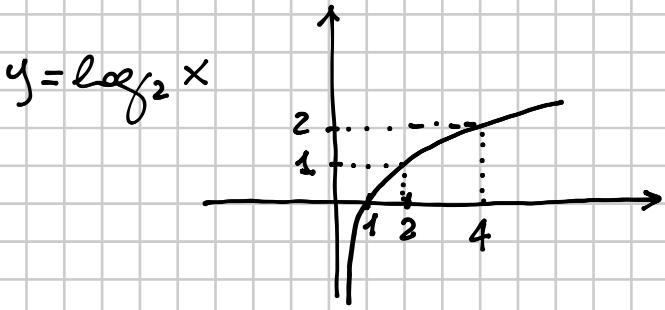
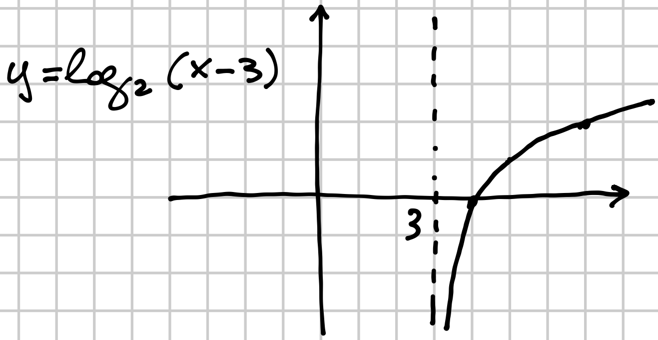
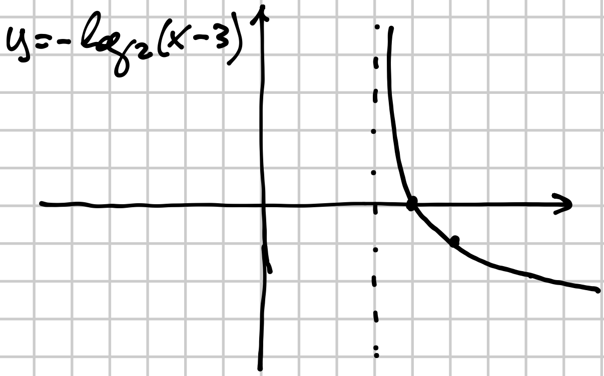
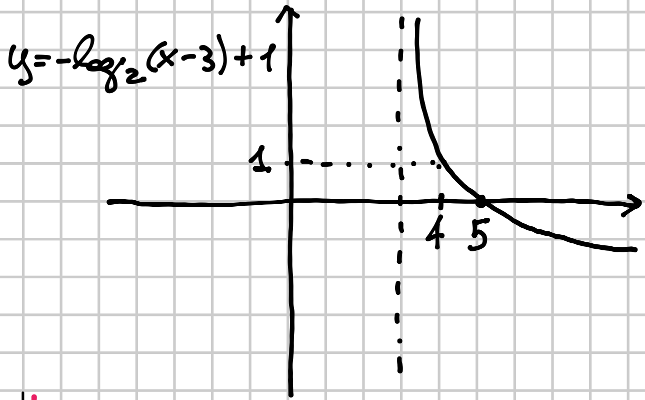
10/5/2022

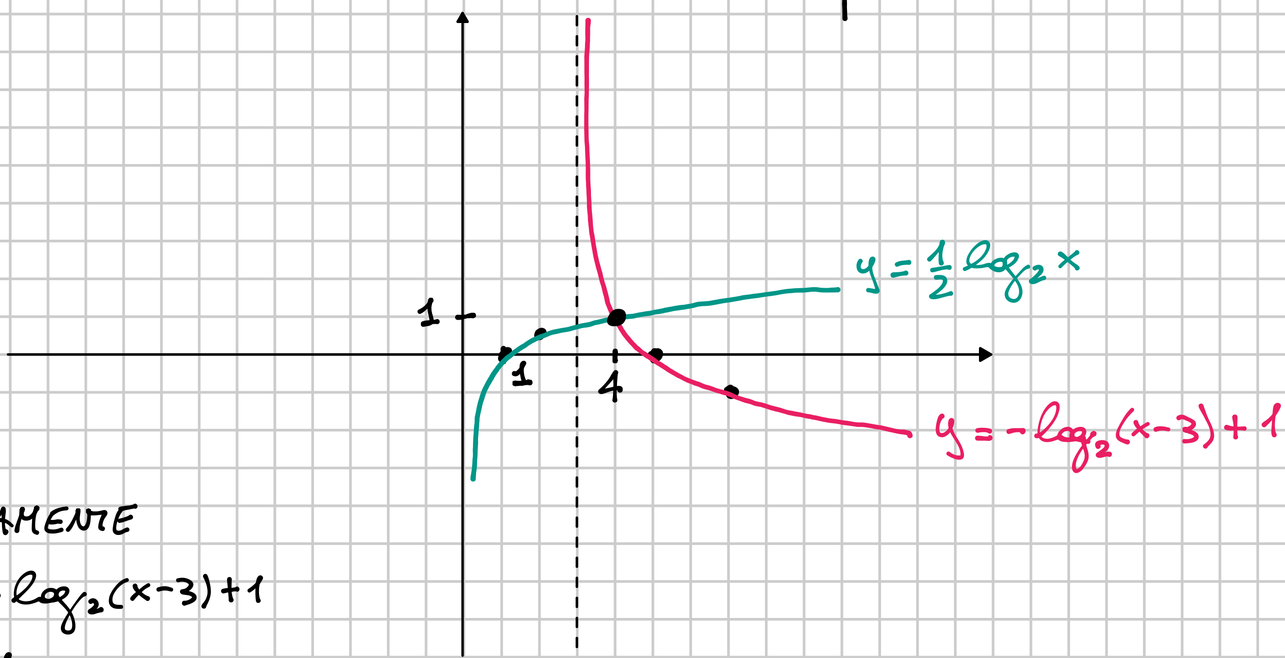
422 Rappresenta graficamente le funzioni $y = -\log_2(x-3)+1$ e $y = \frac{1}{2}\log_2 x$ e trova il loro punto di intersezione sia graficamente che algebricamente. $[(4; 1)]$











ALGEBRICAMENTE

$$\begin{cases} y = -\log_2(x-3)+1 \\ y = \frac{1}{2}\log_2 x \end{cases}$$

$$-\log_2(x-3)+1 = \frac{1}{2}\log_2 x \qquad \text{C.E.} \begin{cases} x-3>0 \\ x>0 \end{cases} \Rightarrow x>3$$

$$-2\log_2(x-3)+2 = \log_2 x$$

$$-2\log_2(x-3)+\log_2 4 = \log_2 x \Rightarrow \log_2(x-3)^{-2}+\log_2 4 = \log_2 x$$

$$\log_2 \frac{4}{(x-3)^2} = \log_2 x \qquad \frac{4}{(x-3)^2} = x$$

$$\begin{cases} \dfrac{4}{(x-3)^2} = x \\ x > 3 \end{cases}$$

$$4 = x(x-3)^2$$

$$4 = x(x^2-6x+9)$$

$$x^3 - 6x^2 + 9x - 4 = 0 \qquad \pm 1 \quad \pm 2 \quad \pm 4$$

$$1 \mapsto 1-6+9-4=0$$

	1	-6	9	-4
1		1	-5	4
	1	-5	4	//

$$(x-1)(x^2-5x+4)=0$$

$$(x-1)(x-1)(x-4)=0$$

$$(x-1)^2(x-4)=0$$

$$\underset{\text{N.ACC.}}{x=1} \lor x=4$$

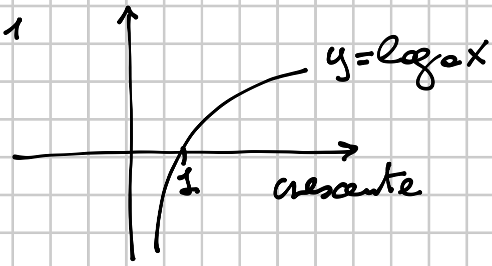
$$\boxed{x=4}$$

$$\begin{cases} x=4 \\ y = \frac{1}{2}\log_2 x = \frac{1}{2}\log_2 4 = \frac{1}{2}\cdot 2 = 1 \end{cases}$$

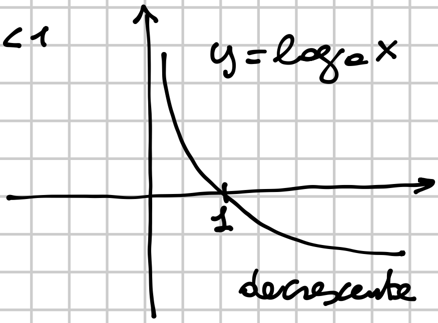
punto di intersezione $\boxed{(4,1)}$

440 $\log_2 x \le \log_2(3x-1)$ $\left[x \ge \dfrac{1}{2}\right]$

se $a>1$



se $0<a<1$



$$\begin{cases} x>0 \\ 3x-1>0 \\ x \le 3x-1 \end{cases} \qquad \begin{cases} x>0 \\ x>\dfrac{1}{3} \\ -2x \le -1 \end{cases} \qquad \begin{cases} x>0 \\ x>\dfrac{1}{3} \\ x \ge \dfrac{1}{2} \end{cases} \qquad \boxed{x \ge \dfrac{1}{2}}$$

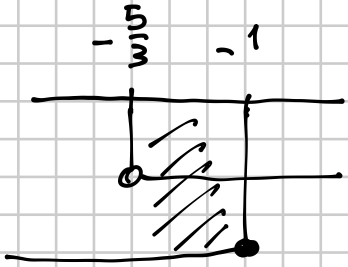
mantengo la stessa disuguaglianza perché base $2>1$

447 $\log_{0,5}(5+3x) \ge \log_{0,5} 2$ $\left[-\dfrac{5}{3} < x \le -1\right]$

BASE $0,5<1$

INVERTO LA DISUG.

$$\begin{cases} 5+3x>0 \\ 5+3x \le 2 \end{cases} \qquad \begin{cases} x>-\dfrac{5}{3} \\ x \le -1 \end{cases}$$



$$\boxed{-\frac{5}{3} < x \le -1}$$

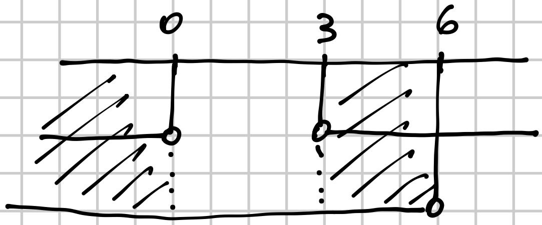
505 $\log_{\frac{1}{3}}(x^2-3x) - 2\log_{\frac{1}{3}}(6-x) < -\log_{\frac{1}{3}} 4$

$[x < -2\sqrt{3} \vee 2\sqrt{3} < x < 6]$

C.E. $\begin{cases} x^2-3x>0 \\ 6-x>0 \end{cases}$ $\begin{cases} x(x-3)>0 \\ x<6 \end{cases}$ $\begin{cases} x<0 \quad \vee \quad x>3 \\ x<6 \end{cases}$

$\Downarrow$

$x<0 \quad \vee \quad 3<x<6$



$$\log_{\frac{1}{3}}(x^2-3x) - \log_{\frac{1}{3}}(6-x)^2 < \log_{\frac{1}{3}} 4^{-1}$$

$$\log_{\frac{1}{3}} \frac{x^2-3x}{(6-x)^2} < \log_{\frac{1}{3}} \frac{1}{4}$$

perché $\frac{1}{3}<1$

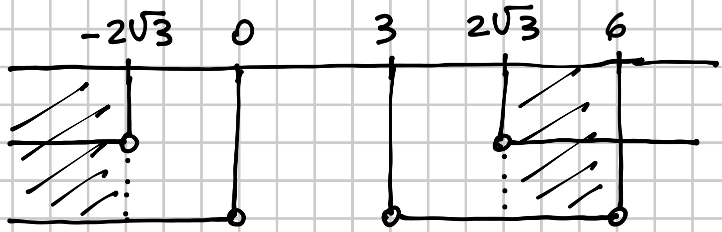
$$\frac{x^2-3x}{(6-x)^2} > \frac{1}{4}$$

$$4(x^2-3x) > (6-x)^2$$

$$4x^2 - \cancel{12x} > 36 + x^2 - \cancel{12x}$$

$3x^2 > 36$ $\quad x^2 > 12$ $\quad x<-\sqrt{12} \quad \vee \quad x>\sqrt{12}$

$\begin{cases} x<-2\sqrt{3} \quad \vee \quad x>2\sqrt{3} \\ x<0 \quad \vee \quad 3<x<6 \end{cases}$



$\boxed{x<-2\sqrt{3} \quad \vee \quad 2\sqrt{3}<x<6}$