23/3/2018

489 $\log_{\frac{1}{3}}(2x+8) \geq \log_{\frac{1}{3}} 6x - 1$

C.E.

$\begin{cases} 2x+8>0 \\ 6x>0 \end{cases}$ $\begin{cases} x>-4 \\ x>0 \end{cases} \Rightarrow \boxed{x>0}$

$\log_{\frac{1}{3}}(2x+8) \geq \log_{\frac{1}{3}} 6x - \log_{\frac{1}{3}} \frac{1}{3}$

$\log_{\frac{1}{3}}(2x+8) \geq \log_{\frac{1}{3}} \frac{6x}{\frac{1}{3}}$

$2x+8 \leq \frac{6x}{1/3}$ perché $a=\frac{1}{3}$ $0<a<1$

$\begin{cases} 2x+8 \leq 18x \\ x>0 \end{cases}$ $\begin{cases} -16x \leq -8 \\ x>0 \end{cases}$ $\begin{cases} x \geq \frac{1}{2} \\ x>0 \end{cases} \Rightarrow \boxed{x \geq \frac{1}{2}}$

513 $(\log_2 x)^3 - 9\log_2 x \leq 0$

$\left[0<x\leq\frac{1}{8} \vee 1\leq x\leq 8\right]$

C.E. $\boxed{x>0}$

$t=\log_2 x$

$t^3-9t \leq 0$

$t(t^2-9) \leq 0$

$t(t-3)(t+3) \leq 0$

		-3		0		3	
$t>0$	$-$		$-$	0	$+$		$+$
$t>3$	$-$		$-$		$-$	0	$+$
$t>-3$	$-$	0	$+$		$+$		$+$
	$-$	0	$+$	0	$-$	0	$+$

$t \leq -3 \quad \vee \quad 0 \leq t \leq 3$

$\log_2 x \leq -3 \quad \vee \quad 0 \leq \log_2 x \leq 3$

$0 < x \leq 2^{-3} \quad \vee \quad 2^0 \leq x \leq 2^3$

$\boxed{0 < x \leq \frac{1}{8} \quad \vee \quad 1 \leq x \leq 8}$

516 $\log_4 |x-3| \leq 1$ $[-1 \leq x \leq 7 \wedge x \neq 3]$

CE $|x-3| > 0$

$\boxed{x \neq 3}$

$\log_4 |x-3| \leq \log_4 4$

$|x-3| \leq 4$

$\begin{cases} x-3 \leq 4 \\ x-3 \geq -4 \end{cases}$

$\begin{cases} x \leq 7 \\ x \geq -1 \end{cases}$

$-1 \leq x \leq 7 \wedge x \neq 3$

$-4 \leq x-3 \leq 4$

$3-4 \leq x \leq 4+3$

$-1 \leq x \leq 7$

$\boxed{-1 \leq x \leq 7 \quad \wedge \quad x \neq 3}$

$\begin{cases} -1 \leq x \leq 7 \\ x \neq 3 \end{cases}$

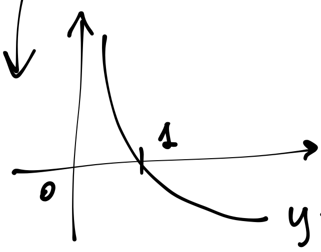
534 TEST Il dominio della funzione $y = \log_2 \log_{\frac{1}{2}} x$ è:

A $[0; 1]$. B $]0; +\infty[$. C $]1; +\infty[$. D $]-\infty; 0[$. ~~E~~ $]0; 1[$.

$[0,1]$ $(-\infty,0)$ $(0,1)$

$y = \log_2 \left(\log_{\frac{1}{2}} (x) \right)$

$\begin{cases} x > 0 \\ \underbrace{\log_{\frac{1}{2}} x}_{} > 0 \end{cases}$ $\begin{cases} x > 0 \\ 0 < x < 1 \end{cases} \Rightarrow \boxed{0 < x < 1}$



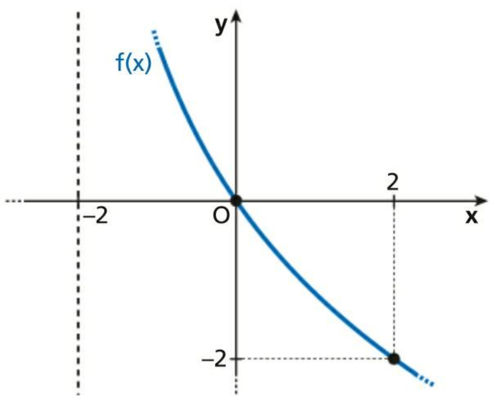
$y = \log_{\frac{1}{2}} x$

535 LEGGI IL GRAFICO L'equazione della funzione rappresentata in figura è del tipo $f(x) = a \log_2 (x+b) + c$. La retta tratteggiata è un asintoto per il grafico di $f(x)$.

a. Trova a, b, c.

b. Calcola per quali valori di x è $f(x) \geq 4$.

$\left[\text{a) } a = -2, b = 2, c = 2; \text{ b) } -2 < x \leq -\frac{3}{2} \right]$



$x + b > 0$ $x > -b$ DOMINIO $(-b, +\infty)$

$\boxed{b = 2}$ perché $x = -2$ è un asintoto

$f(x) = a \log_2 (x+2) + c$

$f(0) = 0$

$f(2) = -2$

$f(0) = a \overbrace{\log_2 2}^{1} + c = 0$

$a + c = 0$

$\begin{cases} a + c = 0 \\ 2a + c = -2 \end{cases}$ $\begin{cases} a = -c \\ -2c + c = -2 \end{cases}$ $\boxed{\begin{cases} a = -2 \\ c = 2 \end{cases}}$

$f(2) = a \log_2 4 + c = -2 \rightarrow 2a + c = -2$

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

$$f(x) \geq 4 \Rightarrow \quad -2\log_2(x+2)+2 \geq 4$$

$$-2\log_2(x+2) \geq 2$$

C.E.

$$\boxed{x > -2}$$

$$\log_2(x+2) \leq -1$$

$$\begin{cases} x+2 \leq 2^{-1} \\ x > -2 \end{cases} \quad \begin{cases} x \leq \frac{1}{2} - 2 \\ x > -2 \end{cases}$$

$$\begin{cases} x \leq -\frac{3}{2} \\ x > -2 \end{cases} \quad \boxed{-2 < x \leq -\frac{3}{2}}$$