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$$\log_9(x+2) - \log_9(x^2-7x+12) \leq \log_9 \frac{1}{x-2} + \boxed{\frac{1}{2}} \quad = \log_9 3$$

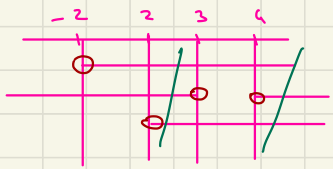
$$\log_9 \frac{(x+2)}{(x-3)(x-4)} \leq \log_9 \frac{3}{x-2}$$

$\log_9$ inj

$$\frac{x+2}{(x-3)(x-4)} \leq \frac{3}{x-2}$$

C.E.: $\begin{cases} x+2>0 \\ x^2-7x+12>0 \\ \frac{1}{x-2}>0 \end{cases}$ $\begin{cases} x>-2 \\ (x-3)(x-4)>0 \\ x>2 \end{cases}$

$\begin{cases} x>-2 \\ x<3 \ \vee \ x>4 \\ x>2 \end{cases}$



$2<x<3 \quad \vee \quad x>4$

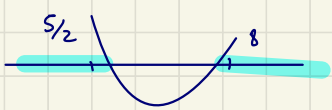
$$\frac{x^2-4-3x^2+21x-36}{(x-2)(x-3)(x-4)} \leq 0$$

$$\frac{-2x^2+21x-40}{(x-2)(x-3)(x-4)} \leq 0 \quad \rightsquigarrow \quad \frac{2x^2-21x+40}{(x-2)(x-3)(x-4)} \geq 0$$

$N \geq 0 \qquad 2x^2-21x+40 \geq 0 \qquad \Delta = 441-320 = 121$

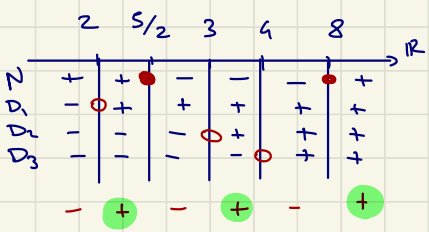
$$\frac{21 \pm 11}{4} \longrightarrow x_1 = 8$$

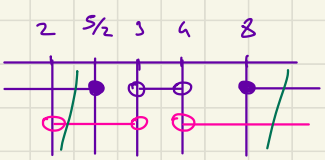
$$\longrightarrow x_2 = \frac{5}{2}$$



$x \leq \frac{5}{2} \ \vee \ x \geq 8$

$D>0 \qquad x>2 \quad x>3 \quad x>4$





$2<x\leq\frac{5}{2} \ \vee \ 3<x<4 \ \vee \ x \geq 8$

$(2;\frac{5}{2}] \cup (3;4) \cup [8;+\infty)$

C.E. $2<x<3 \quad \vee \quad x>4$

Sol: $2<x\leq\frac{5}{2} \ \vee \ x \geq 8 \qquad (2;\frac{5}{2}] \cup [8;+\infty)$

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$4 \cdot 5^x = 3^{2x+1}$

$3^x = 5 \iff x = \log_3 5$

Goal: Mettere in forma: (qualcosa)$^{\text{variabile}}$ = numero

$$\frac{5^x}{3^{2x+1}} = \frac{1}{4} \rightsquigarrow \frac{5^x}{3^{2x} \cdot 3} = \frac{1}{4} \rightsquigarrow \frac{5^x}{3^{2x}} = \frac{3}{4}$$

$$\rightsquigarrow \left(\frac{5}{9}\right)^x = \frac{3}{4} \iff x = \log_{\frac{5}{9}}\left(\frac{3}{4}\right)$$

$$\log_{\frac{5}{9}}\left(\frac{3}{4}\right) = \frac{\log\left(\frac{3}{4}\right)}{\log\left(\frac{5}{9}\right)} = \frac{\log 3 - \overbrace{\log 4}^{\log 2^2}}{\log 5 - \underbrace{\log 9}_{\log 3^2}} = \frac{\log 3 - 2\log 2}{\log 5 - 2\log 3}$$

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$9^x - 3^{x+1} - 10 = 0$

$(3^x)^2 - 3 \cdot 3^x - 10 = 0$ $\qquad 3^x = m$

$m^2 - 3m - 10 = 0$ $\qquad (m-5)(m+2) = 0$ $\qquad m = 5$ o $m = -2$

$3^x = -2 \rightsquigarrow$ Impossibile

$3^x = 5 \iff x = \log_3 5 = \frac{\log 5}{\log 3}$

n 47:

$$\frac{9^{1-2x} \cdot 3^{5x-2}}{2^{x+1}} < \frac{4}{2 \cdot 4^x}$$

$$\frac{3^{2-4x} \cdot 3^{5x-2}}{2^{x+1}} - \frac{4}{2 \cdot 2^{2x}} < 0$$

$$\frac{3^x}{2\cdot 2^x} - \frac{7}{2\cdot 2^{2x}} < 0$$

$$\frac{2^x 3^x - 7}{2\cdot 2^{2x}} < 0$$

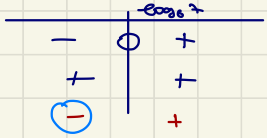
$N>0$: $6^x > 7$ $x > \log_6 7$

$D>0$: $\forall x \in \mathbb{R}$ (exponens)

$$\rightsquigarrow \frac{3^x}{2\cdot 2^x} < \frac{7}{2\cdot 2^{2x}}$$

$$\rightsquigarrow \frac{2^{2x}3^x}{2^x} < 7 \rightsquigarrow 2^x\cdot 3^x < 7$$

$$\rightsquigarrow 6^x < 7 \rightsquigarrow x < \log_6 7$$



$\rightsquigarrow x < \log_6 7$

$(-\infty ; \log_6 7)$