

$$\log_2^3 x - \frac{1}{2} \log_2^2 x^2 - 4 \log_2 x^2 = 0$$

↓

$$\log_2^2 x^2 = (\log_2 x)^2 + (\log_2 x)^2 = 2 \log_2 x^2$$

$$\log_2^3 x - 2 \log_2^2 x - 8 \log_2 x = 0$$

$$\log_2 x (\log_2^2 x - 2 \log_2 x - 8) = 0$$

$$\log\left(2 + \frac{1}{x}\right) - \log\left(2 - \frac{1}{x}\right) < \log(2^{x+1}) + -\log(1-2x)$$

$$\begin{cases} 2 + \frac{1}{x} > 0 \\ 2 - \frac{1}{x} > 0 \\ 2x + 1 > 0 \\ 1 - 2x > 0 \end{cases} \quad \left\{ \begin{array}{l} +\frac{1}{x} > -2 \\ \frac{1}{x} < 2 \\ x > -\frac{1}{2} \\ x < \frac{1}{2} \end{array} \right\} \quad \left\{ \begin{array}{l} x < -\frac{1}{2} \\ x > \frac{1}{2} \\ x > -\frac{1}{2} \\ x < \frac{1}{2} \end{array} \right\}$$

C.E.  $\emptyset$

$$24 \cdot 5^x \geq 5 \cdot 6^{x+1}$$

$$\frac{5^x}{5} \geq \frac{6^{x+1}}{6 \cdot 4} ; \quad 5^{x-1} \geq \frac{1}{4} \cdot 6^x$$

$$\log 5^{x-1} \geq \log \left( \frac{1}{4} \cdot 6^x \right)$$

$$(x-1) \log 5 \geq \log \frac{1}{4} + x \log 6$$

$$x \log 5 - x \log 6 \geq \log 5 - \log 6$$

$$x (\log 5 - \log 6) \geq \log 5 - \log 6$$

$$x \leq \frac{\log 5 - \log 6}{\log 5 - \log 6}$$

$$\log^4 x - 8\log^2 x + 16 > 0$$

$$(\log^2 x - 4)^2 > 0 \quad | \quad x > 0$$

$$\log^2 x \neq 4 \quad | \quad \log x \neq \pm 2$$

$$\begin{cases} \log x = t \\ t^2 = 4 \end{cases} \quad | \quad \begin{cases} x \neq 10^{-2} = \frac{1}{100} \\ x \neq 10^2 = 100 \end{cases}$$

$$S = \mathbb{R}^+ - \left\{ \frac{1}{100}, 100 \right\}$$

$$\log^2 x = (\log x)(\log x)$$

$$\frac{2^x \cdot 3\sqrt[7]{7^{1-x}}}{3^{2x-2}} = \sqrt[2]{4^6 \sqrt[7]{5^{1-x}}}$$

$$\frac{2^x \cdot 7^{\frac{1-x}{3}}}{3^{2x-2}} = 2^{\frac{1-x}{12}}$$

$$2^{x-1} \cdot 7^{\frac{1-x}{3}} = 5^{\frac{1-x}{12}} \cdot 3^{2x-2}$$

$$\log(2^{x-1} \cdot 7^{\frac{1-x}{3}}) = \log\left(5^{\frac{1-x}{12}} \cdot 3^{2x-2}\right)$$

$$(x-1)\log 2 + \frac{1-x}{3}\log 7 = \frac{1-x}{12}\log 5 + (2x-2)\log 3$$

$$(2\log 2 - 12\log 2 + 6\log 7 - 6x\log 7 = \log 5 - x\log 5 + \\ + 2x\log 3 - 24\log 3)$$

$$\times (12\log 2 - 6\log 7 + \log 5 - 24\log 3) =$$

$$= 12 \log 2 - 4 \log 7 + \log 5 - 24 \log 3$$

$$x = 1$$

$$\log_3 \log_{\frac{1}{3}} (2x-3) \leq 0$$

$$\begin{cases} 2x-3 > 0 \\ \log_{\frac{1}{3}} (2x-3) > 0 \end{cases} \quad \begin{cases} x > \frac{3}{2} \\ 2x-3 < 1 \end{cases}$$

$$\begin{cases} x > \frac{3}{2} \\ x < 2 \end{cases} \quad \text{ct.} = \left( \frac{3}{2}, 2 \right)$$

$$\log_3 y \leq 0$$

$$\log_{\frac{1}{3}} (2x-3) \leq 1$$

$$2x-3 \geq \frac{1}{3}$$

$$\frac{3}{\log_2 x - 1} + \frac{2}{\log_2 x + 1} = 2$$

$$\log_2 x = t$$

$$\frac{3}{t-1} + \frac{2}{t+1} = 2$$

$$\left\{ \begin{array}{l} x > 0 \\ \log_2 x - 1 \neq 0 \\ \log_2 x + 1 \neq 0 \end{array} \right.$$

$$3t+3+2t \cancel{\neq} 2^{t^2} \cancel{=} 2$$

$$2t^2 - 5t - 3 = 0$$

$$\left\{ \begin{array}{l} x > 0 \\ x \neq 2 \\ x \neq \frac{1}{2} \end{array} \right.$$

$$\Delta = 25 + 24 = 49$$

$$3$$

$$\mathbb{R}^+ - \left\{ \frac{1}{2}; 2 \right\}$$

$$t_{1,2} = \frac{5 \pm 7}{4} \xrightarrow[3]{\nearrow} -\frac{1}{2}$$

$$\log_2 x = 3 \Rightarrow x = 2^3 \text{ ace.}$$

$$\log_2 x = -\frac{1}{2} \Rightarrow x = 2^{-\frac{1}{2}} = \frac{1}{\sqrt{2}} \text{ ace.}$$

$$\frac{\log_2 x}{\log_2 x + 3} + \frac{6}{\log_2 x - 3} + \frac{72}{9 - \log_2^2 x} = 0$$

$$\log_2 x = t$$

$$\frac{t}{t+3} + \frac{6}{t-3} - \frac{72}{(t+3)(t-3)} = 0 \quad \left. \begin{array}{l} x > 0 \\ \log_2 x \neq -3 \\ \log_2 x \neq 3 \end{array} \right\}$$

$$t^2 - 3t + 6t + 18 - 72 = 0 \quad \left. \begin{array}{l} x > 0 \\ x \neq 1/8 \\ x \neq 8 \end{array} \right\}$$

$$t^2 + 3t - 54 = 0 \quad \mathbb{R}^+ - \left\{-\frac{1}{8}, 8\right\}$$

$$\frac{2\log_4 x - 5}{2\log_4 x + 1} + \frac{6}{\log_4 x^2 - 3} = \frac{7}{4}$$

$$\frac{2\log_4 x - 5}{2\log_4 x + 1} + \frac{6}{2\log_4 x - 3} = \frac{7}{4}$$

$$\log_4 x = t$$

$$\frac{2t - 5}{2t + 1} + \frac{6}{2t - 3} = \frac{7}{4}$$

$$\begin{cases} x > 0 \\ \log_4 x \neq -\frac{1}{2} \\ \log_4 x \neq \frac{3}{2} \end{cases}$$

$$\begin{cases} x > 0 \\ x \neq \frac{1}{2} \\ x \neq 4^{\frac{3}{2}} = \sqrt{16^3} = \end{cases}$$

$$= \sqrt{2^6} = 8$$

$$\mathbb{R}^+ - \{0, 8\}$$

$$y = \ln(2x-1)$$

$$\mathcal{D}: 2x-1 > 0, x > \frac{1}{2}$$

$$\begin{cases} y = \ln(2x-1) \\ x = 0 \end{cases} \quad \text{non ha senso}$$

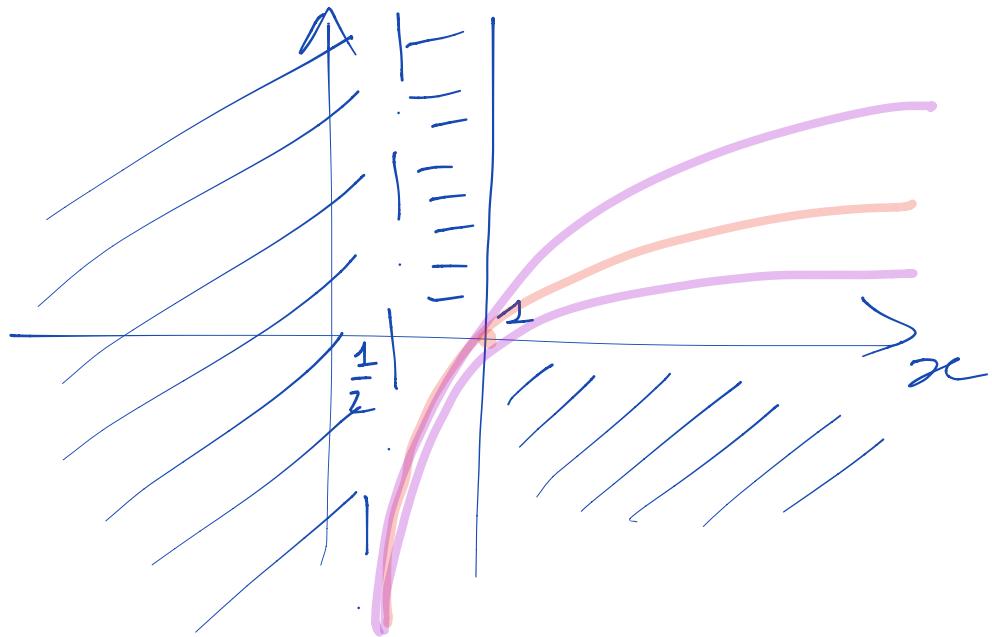
$$\begin{cases} y = \ln(2x-1) \\ y = 0 \end{cases} \Rightarrow \ln(2x-1) = 0 \\ 2x-1 = 1 \\ x = 1$$

$$\ln(2x-1) > 0$$

$$\begin{cases} 2x-1 > 0 \\ 2x-1 > 1 \end{cases} \quad \begin{cases} x > \frac{1}{2} \\ x > 1 \end{cases} \Rightarrow x > 1$$

$\frac{1}{2}$

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$$y = \log(|2^x - 1| - 2)$$

$$|2^x - 1| - 2 > 0$$

$$|2^x - 1| > 2$$

$$2^x - 1 < -2 \vee 2^x - 1 > 2$$

$$\cancel{2^x - 1} \vee 2^x > 3 \quad x > \log_2 3$$