

Решите неравенство

$$\log_2 \frac{x^2}{4} \cdot \log_{0,5} \frac{x}{2} \leq \frac{\log_3(0,5x)}{\log_3 2}$$

$$\log_c(a) / \log_c(b) = \log_b(a)$$

ОДЗ
 $\log_a(b)$
 $b > 0$
 $1 \neq a > 0$

$$\begin{aligned} \log_2(x^2/4) \cdot \log_{0.5}(x/2) &\leq (\log_3(0,5x)) / \log_3(2) \\ \log_2(x^2/4) \cdot \log_2^{-1}(x/2) &\leq (\log_3(0,5x)) / \log_3(2) \\ -\log_2(x^2/4) \cdot \log_2(x/2) &\leq (\log_3(0,5x)) / \log_3(2) \\ -2\log_2(x/2) \cdot (\log_2(x)-1) &\leq (\log_3(0,5x)) / \log_3(2) \\ -2\log_2(x/2) \cdot (\log_2(x)-1) &\leq \log_2(0,5x) \\ -2(\log_2(x)-1) \cdot (\log_2(x)-1) - (-1 + \log_2(x)) &\leq 0 \end{aligned}$$

$$\begin{aligned} \log_2(x) &= t \\ -2(t-1)^2 + 1 - t &\leq 0 \\ -2(t^2 - 2t + 1) + 1 - t &\leq 0 \\ -2t^2 + 4t - 2 + 1 - t &\leq 0 \\ -2t^2 + 3t - 1 &\leq 0 \\ D = 9 - 8 &= 1 \\ t = -(-3 + 1) / 4 &= 1/2 \\ t = -(-3 - 1) / 4 &= 1 \\ -2(x - 1/2)(x - 1) &\leq 0 \\ (x - 1/2)(x - 1) &\geq 0 \\ \log_2(x) &= 1/2 \\ x &= 2^{1/2} \\ x &= \sqrt{2} \end{aligned}$$

$$\begin{aligned} \log_2(x) &= 1 \\ x &= 2 \end{aligned}$$



$$\begin{aligned} \log_2(x) &\geq 1 \\ x &\geq 2 \\ \log_2(x) &\leq 1/2 \\ x &\leq \sqrt{2} \\ x &\in (0; \sqrt{2}] \cup [2; +\infty) \end{aligned}$$