

14.1. Логарифмические неравенства.

1. $11 \cdot \lg(x^2 + 11x + 30) \leq 12 + \lg \frac{(x+6)^{11}}{x+5}$

2. $\log_5(3x+1) + \log_5\left(\frac{1}{72x^2} + 1\right) \geq \log_5\left(\frac{1}{24x} + 1\right)$

3. $\frac{2 \log_4(x^2 - 2x)}{\log_4 x^2} \leq 1$

4. $x^2 \log_{343}(5-x) \leq \log_7(x^2 - 10x + 25)$

5. $\frac{\log_4(64x)}{\log_4 x - 3} + \frac{\log_4 x - 3}{\log_4(64x)} \geq \frac{\log_4 x^4 + 16}{\log_4^2 x - 9}$

6. $\log_5^2(x-1) + 4 \log_5(x-1) - \log_{1/2} 8 \geq 0$

7. $\log_{|2x+1|} x^2 \geq 2$

8. $\frac{3 \log_{0,5} x}{2 - \log_{0,5} x} \geq 2 \log_{0,5} x + 1$

9. $\log_6(64^x + 36^x - 65 \cdot 8^x + 64) \geq 2x$

Ответы:

1) $[-15; -6) \cup (-5; 5]$ 2) $\left[-\frac{1}{6}; -\frac{1}{24}\right] \cup (0; +\infty)$ 3) $(-1; 0) \cup (2; 3]$ 4) $[-\sqrt{6}; \sqrt{6}] \cup [4; 5)$

5) $\left(0; \frac{1}{64}\right) \cup \{4\} \cup (64; +\infty)$ 6) $\left(1; \frac{126}{125}\right] \cup \left[\frac{6}{5}; +\infty\right)$ 7) $\left[-\frac{1}{3}; 0\right)$ 8) $\left(\frac{1}{4}; \frac{1}{2}\right] \cup [2; +\infty)$ 9) $(-\infty; 0] \cup [2; +\infty)$