

Lezioni 5 – 6

Disequazioni esponenziali e logaritmiche.

IN AULA.

A) Elementari.

- $5^{-x}=3$ $S=\{-\log_5(3)\}=\left\{-\frac{\ln 3}{\ln 5}\right\}$
- $2^x < -2$ $S=\emptyset$
- $\sqrt[3]{16} < 4^{(1-x)}$ $S=\left\{x < \frac{1}{3}\right\}$
- $\sqrt{9^{(x+1)}} \geq 25 \cdot 5^{2x}$ $S=\{x \leq -1\}$
- $\left(\frac{1}{2}\right)^x > 4$ $S=\{x < -2\}$
- $5^x < -5$ $S=\emptyset$
- $\left(\frac{1}{3}\right)^{-2x} < 0$ $S=\emptyset$
- $2 \ln x - 3 > 0$ $S=\left\{x > e^{\frac{3}{2}}\right\}$
- $\log_5(x-2) < 0$ $S=\{2 < x < 3\}$
- $\log_{\frac{1}{2}}(3x+5) < 1$ $S=\left\{x > -\frac{3}{2}\right\}$
- $\log_3(-1-x^2) > 4$ $\text{Dominio}=\emptyset$

B) Non elementari.

- $\left(\frac{1}{2}\right)^{3+x^2} \geq \left(\frac{1}{2}\right)^{4x}$ $S=\{1 \leq x \leq 3\}$
- $3 \log^2 x + 4 \log x = 0$ $S=\left\{1, \frac{1}{10 \cdot \sqrt[3]{10}}\right\}$
- $\log(x+2) - \log(x+1) < 0$ $S=\emptyset$
- $\ln(e^{2x-1}) < x^2 + x - 3$ $S=\{x < -1 \vee x > 2\}$
- $e^{\ln(2x-1)} < x^2 + x - 3$ $S=\{x > 2\}$
- $|\ln|x|| - 1 + \ln x^2 < 0$ $S=\left(\frac{-1}{e}, \frac{1}{e}\right) \setminus \{0\}$
- $4^x - 3 \cdot 2^x + 2 > 0$ $S=\{x < 0 \vee x > 1\}$
- $5^x - 4 \geq 5^{(1-x)}$ $S=\{x \geq 1\}$

PROPOSTE lezioni 5-6.

Risolvere le seguenti equazioni e disequazioni.

1. $3^{(x^2+2x)} \geq 1$ $S = \{x \leq -2 \vee x \geq 0\}$
2. $2^x \cdot 4 > \frac{1}{4}$ $S = \{x > -4\}$
3. $\left(\frac{1}{5}\right)^x \geq 5$ $S = \{x \leq -1\}$
4. $\left(\frac{1}{3}\right)^{-2x} > 0$ $S = \mathbb{R}$
5. $\log(x-1) > 0$ $S = \{x > 2\}$
6. $0.25^x - 3 \cdot 0.5^x + 2 < 0$ $S = \{-1 < x < 0\}$
7. $3 - 3^{(x+1)} < 5^x - 15^x$ $S = \{0 < x < \log_5 3\}$
8. $\ln x - 2 \log_x e < 1$ $S = \left\{0 < x < \frac{1}{e} \vee 1 < x < e^2\right\}$
9. $\log_{|x|} x > x$ $S = \{0 < x < 1\}$
10. $\log_2 \frac{x+1}{x-1} - \log_{\frac{1}{2}} \frac{x^2-3x+2}{x^2+1} < 0$ $S = (-3, -1) \cup (2, +\infty)$
11. $\log|x+1| + \log|x-3| < 1$ $S = (1 - \sqrt{4+e}, 1 - \sqrt{4-e}) \cup (1 + \sqrt{4-e}, 1 + \sqrt{4+e})$
12. $2^{\log_2(x-5)} < 16$ $S = \{5 < x < 21\}$
13. $12\left(\frac{4}{9}\right)^x - 35\left(\frac{2}{3}\right)^x + 18 > 0$ $S = \{x < -2 \vee x > 1\}$
14. $2^x + 2^{(4-x)} > 17$ $S = \{x < 0 \vee x > 4\}$
15. $\frac{2^x-5}{2^x+5} < \frac{2^x+5}{2^x-5}$ $S = \{x > \log_2 5\}$
16. $\ln(2x^2 - 5x + 3) < 0$ $S = \left\{\frac{1}{2} < x < 1 \vee \frac{3}{2} < x < 2\right\}$
17. $\ln x + \ln(2x-1) \leq \ln(2x+5) + \ln 3$ $S = \left\{\frac{1}{2} < x \leq 5\right\}$
18. $\sqrt{1 - \log_2 x} > 1$ $S = \{0 < x < 1\}$
19. $\ln \ln(x-1) \geq 0$ $S = \{x \geq e+1\}$
20. $\log_3^2 x + \log_3 x - 6 > 0$ $S = \left\{0 < x < \frac{1}{27} \vee x > 9\right\}$