

Equazioni e Disequazioni – Esercizi di riepilogo

Prof. Roberto Squellati – Classi V

29 ottobre 2005

- $|x^2 - 5x + 6| = x^2 - 3$
- $x^3 + (x - \sqrt{3})^3 = 0$
- $(x + 3)^3(4 - x^2)^4(-x^2 + 6x - 5)^5 \geq 0$
- $\frac{1}{(x-1)^3} + \frac{1}{x^3} \leq 0$
- $\frac{x^2 + 4x + 2}{x + 1} > \sqrt{x^2}$
- $2^x > 2 + 2^{-x}$
- $\operatorname{sen} x - \cos x = 1$
- $\operatorname{sen} 2x > \cos x$
- $\sqrt{2 \log_2 x + 3} \geq \log_2 x$
- $2\sqrt[3]{(e^x - 1)^2} - e^x = 0$
- $(1 + x)\sqrt{x^2 + 2x} = 2\sqrt{3}$
- $1 - \cos x \geq \sqrt{\operatorname{sen} x}$
- $x^4 + 5x^3 + x^2 - 11x + 4 \geq 0$
- $\sqrt{2x - 1} - \sqrt{x} - 2 = 0$
- $\log_x 5 + 2 \log_x \frac{1}{x} = \log_{1/x} 5x$
- $x^3 - 11x^2 + 10x \leq 0$
- $\frac{x^2 - 3x - 18}{x^3 - 12x^2 + 32x} \leq 0$
- $\frac{4}{x} - 3 > \frac{5}{2x - x^2}$
- $|x - 3| < 2$
- $\sqrt[3]{8x^3 - 32x^2 + 65x - 21} > 2x - 3$
- $2x + 1 > \sqrt{4x^2 - 9x + 2}$
- $3 \log_{1/2}(x - 1) < 2 \log_{1/2} x + \log_{1/2}(x - 3)$
- $\operatorname{tg} x > \operatorname{cotg} x$
- $\frac{a^x \sqrt{a^{2+x}}}{\sqrt[3]{a^{x-1}}} > a^2$
- $\frac{2e^{2x} - 6e^x + 2 + x/|x|}{\sqrt{1 - (e^x - 1)^2}} \leq 0$
- $\frac{(3 \ln x - 1) - 3\sqrt[3]{3 \ln x - 1} - 2}{\sqrt[3]{3 \ln x - 1}} \leq 0$
- $-6x^2 - |x| + 1 > 0$
- $x^3 - 2x^2 - x + 2 \geq 0$
- $\sqrt{\frac{2}{x} + |1 + x|} < 1$
- $\frac{\ln(|x| - 1)}{x} < 0$
- $\frac{\ln(x - 2)}{\sqrt{1 + \ln(x - 2)}} < 2$
- $\cos(x + |x|) > 0$
- $\frac{1 - 2 \operatorname{sen} x}{1 + 2 \cos x} \leq 0$
- $\frac{\operatorname{sen} x}{\sqrt{1 - 2 \operatorname{sen} x}} > 1, \quad x \in [0, 2\pi]$
- $\ln |\operatorname{tg} x - 1| \geq 0, \quad x \in [0, 2\pi]$
- $\frac{e^{2x} - e^x}{2e^{2x} - 5e^x + 2} > -1$
- $\frac{\sqrt{|1 - e^x| - 1}}{e^x - 4} \geq 1$
- $\frac{\operatorname{tg}^2 x - \sqrt{3} \operatorname{tg} x}{\operatorname{tg}^2 x - 1} < 1, \quad x \in [0, \pi]$
- $\frac{1 - \ln(x^2 + x)}{\ln(x - 1)^2 - 1} \geq -1$
- $2\sqrt{\frac{x^2 - 4}{2x^2 - 5x + 3}} < \sqrt{2}$
- $\frac{\ln |\cos x|}{\cos^2 x - |\cos x| + 1} \geq 0$
- $\frac{\cos 2\sqrt{x} - \operatorname{sen} \sqrt{x}}{\operatorname{sen} 2\sqrt{x} - \operatorname{sen} \sqrt{x}} \leq 1, \quad x \in [0, 4\pi^2]$
- $\ln \frac{\sqrt[3]{x^2} - 4}{\sqrt[3]{x} - 1} \leq \ln \sqrt[3]{|x|}$
- $\log_{1/2} \frac{\sqrt[3]{x} + 2}{\sqrt[3]{x} - 1} \geq \log_{1/2}(\sqrt[3]{x} + 3)$
- $\frac{4 \operatorname{sen}^2 x - 3}{\operatorname{sen} x} > 2 \frac{\cos x}{|\operatorname{sen} x|}$
- $\sqrt{\frac{x^2 + 8|x| - 9}{x^2 - 1}} \geq x - 3$
- $\frac{5 + x + \sqrt{1 - x}}{x^2 - 1} > \frac{2}{x - 1}$

Soluzioni

1. $x = 9/5$
2. $x = \sqrt{3}/2$
3. $x \leq -3, x = -2, 1 \leq x \leq 5$
4. $x < 0, \frac{1}{2} \leq x < 1$
5. $-2 < x < -1, x > -\frac{1}{2}$
6. $x > \log_2(\sqrt{2} + 1)$
7. $x = \frac{\pi}{2} + 2k\pi, x = \pi + 2k\pi \quad k \in \mathbb{Z}$
8. $\frac{\pi}{6} + 2k\pi < x < \frac{\pi}{2} + 2k\pi,$
 $\frac{5}{6}\pi + 2k\pi < x < \frac{3}{2}\pi + 2k \quad k \in \mathbb{Z}$
9. $\frac{1}{2\sqrt{2}} \leq x \leq 8$
10. $x = \ln 2, x = \ln(3 - \sqrt{5}), x = \ln(3 + \sqrt{5})$
11. $x = 1$
12. $\frac{\pi}{2} + 2k\pi \leq x \leq \pi + 2k\pi, x = 2k\pi \quad k \in \mathbb{Z}$
13. $x \leq -4, -1 - \sqrt{2} \leq x \leq 1, x \geq -1 + \sqrt{2}$
14. $x = 25$
15. $x = 0$
16. $x \leq 0, 1 \leq x \leq 10$
17. $x \leq -3, 0 < x < 4, 6 \leq x < 8$
18. $0 < x < \frac{1}{3}, 2 < x < 3$
19. $1 < x < 5$
20. $x < -2, x > -\frac{3}{4}$
21. $\frac{1}{13} < x \leq \frac{1}{4}, x \geq 2$
22. $x > 3$
23. $\frac{\pi}{4} + k\frac{\pi}{2} < x < \frac{\pi}{2} + k\frac{\pi}{2} \quad k \in \mathbb{Z}$
24. $a \in (1, +\infty), x > 4/7 \quad a \in (0, 1), x < 4/7$
25. $x = \ln\left(\frac{3 - \sqrt{7}}{2}\right)$
26. $x = 1, \sqrt[3]{e} < x \leq e^3$
27. $-\frac{1}{3} < x < \frac{1}{3}$
28. $-1 \leq x \leq 1, x \geq 2$
29. $-(1 + \sqrt{3}) < x \leq -2$
30. $x < -2, 1 < x < 2$
31. $2 + \frac{1}{e} < x < 2 + e^{2(1+\sqrt{2})}$
32. $x < 0, k\pi \leq x < \frac{\pi}{4} + k\pi,$
 $\frac{3}{4}\pi + k\pi < x \leq \pi + k\pi, k \in \mathbb{Z}^+$
33. $\frac{\pi}{6} + 2k\pi \leq x < \frac{2}{3}\pi + 2k\pi,$
 $\frac{5}{6}\pi + 2k\pi \leq x < \frac{4}{3}\pi + 2k\pi \quad k \in \mathbb{Z}$
34. $\arcsin(\sqrt{2} - 1) < x < \frac{\pi}{6},$
 $\frac{5}{6}\pi < x < \pi - \arcsin(\sqrt{2} - 1)$
35. $\arctan(2) \leq x \leq \pi,$
 $\arctan(2) + \pi \leq x \leq 2\pi, x \neq \frac{\pi}{2}, \frac{3}{2}\pi$
36. $x < \ln\left(\frac{3 - \sqrt{3}}{3}\right),$
 $\ln\frac{1}{2} < x < \ln\left(\frac{3 + \sqrt{3}}{3}\right), x > \ln 2$
37. $\ln 4 < x \leq \ln 6$
38. $0 \leq x < \frac{\pi}{6}, \frac{\pi}{4} < x < \frac{\pi}{2}, \frac{3}{4}\pi < x \leq \pi$
39. $x < -1, \frac{1}{3} \leq x < 1, 1 < x < 1 + \sqrt{e}$
40. $-\frac{5 + \sqrt{177}}{4} < x \leq -2, 2 \leq x < \frac{-5 + \sqrt{177}}{4}$
41. $x = k\pi \quad k \in \mathbb{Z}$
42. $\frac{\pi^2}{64} \leq x < \frac{\pi^2}{9}, \frac{25}{64}\pi^2 \leq x < \pi^2,$
 $\frac{81}{64}\pi^2 \leq x \leq \frac{169}{64}\pi^2, \frac{25}{9}\pi^2 < x \leq 4\pi^2$
43. $-8 < x \leq \left(\frac{1 - \sqrt{33}}{4}\right)^3, 8 < x \leq 64$
44. $-\left(\frac{1 + \sqrt{21}}{2}\right)^3 \leq x < -8, x \geq \left(\frac{-1 + \sqrt{21}}{2}\right)^3$
45. $\frac{2}{5}\pi + 2k\pi < x < \frac{4}{5}\pi + 2k\pi, \pi + 2k\pi < x < \frac{7}{5}\pi + 2k\pi,$
 $\frac{9}{5}\pi + 2k\pi < x < 2\pi + 2k\pi$
46. $x \leq \frac{5 + \sqrt{17}}{2}, x \neq \pm 1$
47. $x < -1$