Equazioni logaritmiche

equazioni logaritmiche risolubili mediante definizione ed applicazione dei teoremi sui logaritmi

1	$log_3 x = 2$	$x = 9$
2	$log_{\frac{1}{10}} x = -3$	$x = 10^3$
3	$ln(x+2) = 0$	$x = -1$
4	$ln(x+1) = -2$	$x = \frac{1}{e^2} - 1$
5	$log_2(x+2x^2) - log_3 9 = 1$	$x = \frac{-1 \pm \sqrt{65}}{4}$
6	$log_4(2x-1) = log_4 x$	$x = 1$
7	$ln(x-2) - ln\,3 = ln(5-x) - ln\,2$	$x = \frac{19}{5}$
8	$ln(4x+5) + ln(x-2) = ln3 + ln(5-x)$	$x = \frac{5}{2}$
9	$ln\,10 - ln(x-1) = ln\,8 - ln(x+3)$	*impossibile*
10	$ln\,2 + ln\,x = 2\,ln(4x-15)$	$x = \frac{9}{2}$
11	$ln2x + ln\frac{x}{2} = ln4$	$x = 2$
12	$lnx = 2ln2x$	$x = \frac{1}{4}$
13	$log_5(x^2+x+1) = 1$	$x = \frac{-1 \pm \sqrt{17}}{2}$
14	$ln(x^2+12x+5) = ln\,2 + ln(x-10)$	*impossibile*
15	$ln\,x + ln\,3 = ln(x^2+2)$	$x = 1 \cup x = 2$
16	$log_3 4 + log_3 2 + 2\,log_3 x = log_3(x^2-3) + log_3(x^2+3)$	$x = 3$
17	$log_x 2 = \frac{1}{\sqrt{2}}$	$x = 2^{\sqrt{2}}$
18	$log_3 2 + log_3 x = log_3 \frac{1}{2} + log_3 \frac{1}{x}$	$x = \frac{1}{2}$
19	$log(2x+2) - log(x-1) = 1 - [log(3x-2) - log\,x]$	$x = \frac{3 \pm \sqrt{5}}{2}$
20	$log_3 x = 1$	$x = 3$
21	$log_3(2x-1) = -1$	$x = \frac{2}{3}$

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22	$log_{\frac{1}{2}}(x-2)=0$	$x=3$
23	$log_4(3x-4)=-\frac{3}{2}$	$x=\frac{11}{8}$
24	$log_{\frac{3}{2}}\frac{x-2}{3}=-2$	$x=\frac{10}{3}$
25	$log_x 4=1$	$x=4$
26	$log_{x+1} 1=0$	$-1<x<0 \cup x>0$
27	$log_{x-2} 9=2$	$x=5$
28	$log_{\frac{1}{x}} -2=2$	*impossibile*
29	$log_{3-2x}\frac{1}{3}=-2$	$x=\frac{3-\sqrt{3}}{2}$
30	$log_2(x+1)+log_2 3=log_2(x-1)$	$x=-2$
31	$log_3(3x+1)-log_3 x=2$	$x=\frac{1}{6}$
32	$2\,log_2(x+2)+log_{\frac{1}{2}} x+1=0$	*impossibile*
33	$\frac{1}{2}log_3 x^2+2=-log_{\frac{1}{3}} 2$	$x=\pm\frac{2}{9}$
34	$3\,log_{\frac{1}{2}} x-2=log_2(x^3-1)$	$x=\sqrt[3]{\frac{1+\sqrt{2}}{2}}$
35	$log_2(x-2)-log_4(3x-1)=1$	$x=8+2\sqrt{14}$
36	$2\,log_{\frac{1}{3}}\left(\frac{1}{3}x-1\right)=2-log_9 x^4$	*impossibile*
37	$log_2\,log_3\frac{3x-1}{x}=2$	$x=-\frac{1}{78}$
38	$log_{\frac{1}{3}}\,log_2(3x-1)=0$	$x=1$
39	$log_2\,ln(x+1)=1-log_4 3$	$x=e^{\frac{2}{\sqrt{3}}}-1$

equazioni logaritmiche risolubili mediante una posizione

40	$2\,log^2 x+5\,log\,x-3=0$	$x=10^{-3} \cup x=\sqrt{10}$
41	$log_2{}^2 x-4\,log_2 x+4=0$	$x=4$

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42	$3\,log^2 x + log\,x = -4$	*impossibile*
43	$2\,log^2 x + 3 = 7\,log\,x$	$x = 10^3 \cup x = \sqrt{10}$
44	$3\,log^2 x + 5\,log\,x = 0$	$x = 1 \cup x = 10^{-\frac{5}{3}}$
45	$log_3^2 x + log_3 x - 12 = 0$	$x = 27 \quad x = \frac{1}{81}$
46	$-2ln^2 x + lnx + 1 = 0$	$x = e \quad x = \frac{1}{\sqrt{e}}$
47	$ln^3 x - 9lnx = 0$	$x = 1 \quad x = e^3 \quad x = e^{-3}$
48	$ln^2 x - 2\,ln\,x + 1 = 0$	$x = e$
49	$log\,x\,(log\,x + 1) + 5\,log\,x = log^2 x + 4\,log\,x - 7$	$x = 10^{-\frac{7}{2}}$
50	$log_2{}^2 x + 95 = 8\sqrt{6}\,log_2 x$	$x = 2^{\,4\sqrt{6}-1} \cup x = 2^{\,4\sqrt{6}+1}$
51	$3(logx + 1) = 5\,log^2 x$	$x = 10^{\frac{3-\sqrt{69}}{10}} \cup x = 10^{\frac{3+\sqrt{69}}{10}}$
52	$2\,log_2(x+3) + \frac{2}{log_2(x+3)} = 5$	$x = \sqrt{2} - 3 \cup x = 1$
53	$\frac{1}{log\,x} + \frac{2}{log\,x + 1} = 2$	$x = 10 \cup x = \sqrt{10}/10$
54	$\frac{ln\,x + 1}{ln^2 x + 1} = 1$	$x = 1 \cup x = e$
55	$(log\,x - 3)(log\,x + 3) = 0$	$x = 10^3 \cup x = 10^{-3}$
56	$log_5 x - log_{25} x = 1$	$x = 25$
57	$\frac{3}{log_4 x} + \frac{3}{2 + log_4 x} = -\frac{1}{log_4 x + 1}$	$x = 2^{\frac{-2\sqrt{7}\pm 2}{\sqrt{7}}}$
58	$\frac{4 - 2\,log_4 x}{log_4 x} = \frac{5 + 3\,log_4 x}{3\,log_4 x + 5}$	$x = 4^{\frac{4}{3}}$
59	$log_2^2 x - 4\,log_2 x + 3 = 0$	$x = 2 \cup x = 8$
60	$2ln^2(x-1) - 5\,ln(x-1) + 2 = 0$	$x = \sqrt{e} + 1 \quad x = e^2 + 1$
61	$log_3^2(x+2) - log_3(x+2) - 2 = 0$	$x = -\frac{5}{3} \cup x = 7$
62	$3log_{\frac{1}{2}}^2 x - 11log_{\frac{1}{2}} x - 4 = 0$	$x = \sqrt[3]{2} \quad x = \frac{1}{16}$

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63	$ln^2(x^2-1)+3ln(x^2-1)=0$	$x=\pm\sqrt{1+\frac{1}{e^3}}\ \cup x=\pm\sqrt{2}$
64	$log_2^2 x-log_2 x^3+2=0$	$x=2\ \cup x=4$
65	$log_3^2(x-2)+log_{\frac{1}{3}}(x-2)=6$	$x=\frac{19}{9}\ \cup x=29$
66	$log_2^2(2x+1)-log_{\frac{1}{2}}(2x+1)=0$	$x=0\ \cup x=-\frac{1}{4}$
67	$log_{x-1}^2 3-log_{x-1}3-2=0$	$x=\frac{4}{3}\ \cup x=1+\sqrt{3}$
68	$log_2^4(2x-3)-5log_2^2(2x-3)+4=0$	$x=\frac{5}{2}\ \cup x=\frac{7}{2}$ $\cup x=\frac{7}{4}\ \cup x=\frac{13}{8}$
69	$2log_4^2\,x(x-1)+log_{\frac{1}{4}}[x(x-1)]^7+3=0$	$x=-1\ \cup x=2$ $\cup x=\frac{1\pm\sqrt{257}}{2}$
70	$log_{2x+1}^2 27+log_{2x+1}{}^1/_{27}-6=0$	$x=1\ \cup x=\frac{\sqrt{3}-9}{18}$
71	$log_{\frac{1}{3}}^2(3x+1)+log_3(3x+1)^6=-9$	$x=-\frac{26}{81}$
72	$log_2(x-4)-3=\frac{2}{log_{\frac{1}{2}}(x-4)}$	$x=6\ \cup x=8$
73	$-log_{\frac{1}{3}}(2x+5)\,(log_3(2x+5)-1)=2$	$x=-\frac{7}{3}\ \cup x=2$
74	$(log_2(3x+4)-1)^2=log_2 2$	$x=-1\ \cup x=0$
75	$log_{\frac{1}{2}}^2[x(x+4)]=log_{\frac{1}{2}}[x(x+4)]$	$x=-2\pm\sqrt{5}$ $\cup x=-\frac{4\pm3\sqrt{2}}{2}$
76	$log_3 2x^2\,(log_3 2x^2-1)=log_3 2x^2+3$	$x=\pm\sqrt{\frac{27}{2}}$ $\cup x=\pm\sqrt{\frac{1}{6}}$
77	$log_2(x-3)^2\,(log_2(x-3)-2)-log_{\frac{1}{2}}(x-3)=2$	$x=7\ \cup x=\frac{1}{\sqrt{2}}+3$
78	$log_3^2(2x^2-x)=1$	$x=-1\ \cup x=\frac{3}{2}$ $\cup x=\frac{3\pm\sqrt{33}}{12}$

equazioni logaritmiche con argomento esponenziale		
79	$ln\,2^x=0$	$x=0$

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80	$log_5 7^x = 1$	$x = log_7 5$
81	$log_5 2^{x-1} = \frac{1}{4}$	$x = 1 + \frac{1}{4\, log_5 2}$
82	$ln(1 - e^x) = 0$	*impossibile*
83	$1 - log\, 3^x = log\, 2^x$	$x = \frac{ln\, 10}{ln\, 6}$
84	$log(3^x + 1) + log(3^x - 1) = 2$	$x = \frac{1}{2} log_3 101$
85	$x\, log_2 3 + log_2 5^x = (2x - 1)\, log_2 5 - x\, log_2 5$	$x = -\frac{ln\, 5}{ln\, 3}$
86	$ln(2^{2x} - 9 \cdot 2^x + 21) = 0$	$x = 2 \cup x = \frac{ln\, 5}{ln\, 2}$
87	$log_2(4^x + 2^x) - log_2 2 = 0$	$x = 0$
88	$ln\, 4^{x^2-6} - ln\, 64 = 0$	$x = \pm 3$
89	$log_2(2^x + 1) + log_2{}^2(2^x + 1) - 2 = 0$	$x = 0$

equazioni logaritmiche di riepilogo

90	$log_4(x^2 + 2) - log_4(x^2 - 1) = log_4 5 - log_4(x + 1)$	*impossibile*
91	$log(10 - x^2) - log\, 8 = 2\, log \frac{x}{5} - 2\, log \frac{\sqrt{2}}{5}$	$x = \sqrt{2}$
92	$(log_2 x^2)^2 + 9\, log_2 x + 2 = 0$	$x = \frac{1}{4}, x = \frac{1}{\sqrt[4]{2}}$
93	$log(x - 1) - 2 \cdot log(x + 1) - log\, 8 = -2$	*impossibile*
94	$\frac{3}{log_2 x - 1} + \frac{2}{log_2 x + 1} = 2$	$x = 8, x = \frac{\sqrt{2}}{2}$
95	$log_2 3^x - 2 = 0$	$x = \frac{ln\, 4}{ln\, 3}$
96	$2\, log_3 4^x = log_{\frac{1}{3}} 2^{-x}$	$x = 0$
97	$ln\, 2^{\frac{x-1}{2}} - 1 = 0$	$x = 1 + \frac{2}{ln\, 2}$
98	$\frac{3}{2} ln\, 2^{x+1} - 2\, ln \frac{1}{2} = 1$	$x = \frac{1}{3}\left(\frac{2}{ln\, 2} - 7\right)$
99	$-2\, Log\, 4^{2-x} + 5\, Log\, 2^{x+1} = 1$	$x = log_{512} 80$

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100	$2\,ln\,3^{\frac{x-1}{3x+1}} = ln\,9$	$x = -1$
101	$-ln\,2^x + 2\,ln\,3 = 1 - ln\,4^{-x}$	$x = \frac{ln\,9 - 1}{ln\,8}$
102	$x\,log_2\,3 - log_4\,9 = 0$	$x = 1$
103	$(2x-1)\,log_7\,2 = 1 + x\,log_{\frac{1}{7}}\,4$	$x = \frac{ln\,14}{ln\,16}$
104	$(x+1)\,ln\,3 - ln\frac{1}{9} = 2\,ln\left(\frac{1}{3}\right)^x$	$x = -1$
105	$\frac{1}{x}ln\,2 + 4\,log_2\,e = 0$	$x = -\ln^2\sqrt{2}$
106	$ln\,3^x + 2\,log_{3^x}\,e - 3 = 0$	$x = \frac{1}{ln\,3} \cup x = \frac{2}{ln\,3}$
107	$xLog\,2 - 3\,log_{2^x}\,10 - 2 = 0$	$x = -\frac{ln\,10}{ln\,2}$ $\cup x = 3\frac{ln\,10}{ln\,2}$
108	$2 - 3x\,log_4\,3^x + 2(log_4\,9 - log_4\,4) = 0$	$x = \pm\frac{2}{3}\sqrt{3}$
109	$\big((x+1)\,Log\,3 - 1\big)(1 + Log\,3^{x+1}) = 0$	$x = -1 \pm \frac{1}{Log\,3}$
110	$Log(2^{4x} - 1) + 2\,Log\,3 = (1-2x)\,Log\,4$	$x = log_{16}\left(\frac{4}{3}\right)$
111	$3 - x + log_2\,3^{2x+1} = 0$	$x = -\frac{ln\,24}{ln\,9 - ln\,2}$
112	$log_3\left(9^{x+\frac{3}{2}} - 2\right) = x + 1$	$x = -1$
113	$ln\lvert 3^x - 1\rvert = xln\,9$	$x = log_3\left(\frac{\sqrt{5}-1}{2}\right)$
114	$Log(4^x - 1) + Log\,2 = Log(2^{2x} + 3\cdot 2^{x+1} - 10)$	$x = 2$
115	$log\,5 - log(2x-3) = 1$	$x = \frac{7}{4}$
116	$(2\,log\,x - 5)\,log\,x = 3 - log\,x$	$x = 10^{\frac{2-\sqrt{10}}{2}} \cup x = 10^{\frac{2+\sqrt{2}}{2}}$
117	$log(e^x + 1) = log(e^{2x} - 1)$	$x = \ln 2$
118	$log\,5 + (x-2)\,log\,4 = log(4^x - 11)$	$x = 2$
119	$\frac{1}{2\,log_2\,x - 2} + \frac{3}{log_2{}^2\,x - 1} = \frac{1}{4}$	$x = \frac{1}{8} \cup x = 32$
120	$\frac{log\,x - 2}{log\,x - 1} + \frac{log\,x - 2}{log\,x - 3} = \frac{log^2\,x - 4}{(log\,x - 3)(1 - log\,x)}$	$x = 10^2 \cup x = 10^{\frac{2}{3}}$

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121	$log_2(2^x-1)\,log_2(2^{x+1}-2)=0$	$x=1 \cup x=\log_2\frac{3}{2}$
122	$ln(e^{2x}-1)=ln(1-e^x)$	*impossibile*
123	$log_3\sqrt{x^2-x}=log_3\sqrt{2}$	$x=-1 \cup x=2$
124	$log_3(2x-1)+log_{\frac{1}{3}}(x-4)=-1$	*impossibile*
125	$log_{\frac{1}{2}}(x-1)-log_2(x+1)=3$	$x=\frac{3\sqrt{2}}{4}$
126	$log(3^{2x}+2)+log_{\frac{1}{10}}(3^x-2)=1$	$x=\log_3 5+\sqrt{3}$
127	$\frac{1}{2}ln(x-1)+ln\sqrt{3}=\frac{1}{2}[ln(5x^2-20)-ln(x-2)]$	*impossibile*
128	$log\left(5^{1+\sqrt{x}}+5^{1-\sqrt{x}}\right)=1$	$x=0$
129	$ln\left(\sqrt{3}senx+cosx\right)=0$	*impossibile*
130	$2x^{2\,ln\,x}+5x^{ln\,x}-3=0$	*impossibile*
131	$x^{cosx}=x^{\frac{\sqrt{3}}{2}}$	$x=1 \cup x=\pm\frac{\pi}{6}+2k\pi$
132	$x^x=1$	$x=1$
133	$log_x\,x=0$	$x=1$
134	$x^x=x^{3-x}$	$x=\frac{3}{2} \cup x=1$
135	$log_2(3-2x)-2\,log_{\frac{1}{2}}x=0$	$x=1$
136	$xlog\,3=1$	$x=\frac{1}{ln\,3}$
137	$log_3^2(3x-1)-log_{\frac{1}{3}}(3x-1)^4+3=0$	$x=\frac{4}{9} \cup x=\frac{28}{81}$
138	$log_2\frac{x}{2}-log_4\,3x=1$	$x=48$
139	$\left(\frac{1}{2}ln\,2x-ln\,3\right)\left(\frac{1}{ln\,x}-4\right)=0$	$x=\frac{9}{2} \cup x=\sqrt[4]{e}$
140	$log_x\,3=2\,log_{\frac{1}{x}+1}\sqrt{3}$	$x=\frac{1+\sqrt{5}}{2}$