

Log Base 10 Problems

Solve for x .

(Find the exact answers—in terms of log if required. If complicated, also give a numeric approximation.)

1. $\log x + 1 = 0$.
2. $\log(x + 1) = 0$.
3. $\frac{1}{\log x} + 1 = 0$.
4. $\frac{1}{\log x + 1} = 1$.
5. $\frac{1}{\log x + 1} = -1$.
6. $\log\left(\frac{1}{x}\right) + 1 = 0$.
7. $x^{\log(x+1)} = 1$.
8. $x^{\log(x+1)} = 0$.
9. $x^{\log(x+2)} = 0$.
10. $x^{\log x} - 1 = 0$.
11. $x^{\log x} - 10 = 0$.
12. $(x + 1)^{\log(x+1)} = 2$.
13. $2^{(10^x)} = 100$.
14. $2^{(10^x)} = 1$.
15. $(2^{10})^x = 1$.
16. $(10^{10})^x = 500,000$.
17. $x^x = x$.
18. $\log\left(1 + \frac{1}{x}\right) \cdot \log\left(1 - \frac{1}{x+1}\right) = -4$.
19. $(\log x)(\log 9x) = 8$.
20. $(1 + \log x)(\log x - 3) = 5$.
21. $2 \cdot 10^x + 10^{2x} = 99$.
22. $(10^x)^x = 64$.
23. $10^x \cdot 10^x = 0.16$.
24. $x^{\log(-x)} = -\sqrt[9]{10}$.
25. $x^{\log(-x)} = -\sqrt[4]{10}$.

ANSWERS ARE ON OPPOSITE SIDE

ANSWERS

1. $1/10$ or 0.1
2. 0
3. $1/10$ or 0.1
4. 1
5. $1/100$ or 0.01
6. 10
7. 1
8. no solution
9. 0
10. 1
11. 10 ; and $1/10$ (as a decimal: 0.1)
12. $10^{\pm\sqrt{\log 2}} - 1$, approximately 2.537219454 or -0.717292067
13. $\log\left(\frac{2}{\log 2}\right)$, approximately 0.822420223
14. no solution
15. 0
16. $\frac{1}{10} \log 500,000$, approximately 0.569897
17. 1 or -1
18. $1/99$ or $-100/99$
19. $10^{\frac{-\log 9 \pm \sqrt{(\log 9)^2 + 32}}{2}}$, approximately 246.1874268 and 0.0004513273182
20. $10,000$; and $1/100$ (as a decimal: 0.01)
21. $\log 9$ (An approximate decimal value is 0.954242509 .)
22. $\pm\sqrt{\log 64}$ (Note: $\sqrt{\log 64} \neq \log 8$. Answers are approximately ± 1.343941953 .)
23. $\log 0.4$ (An approximate decimal value is -0.397940009 .)
24. $-\sqrt[3]{10}$ and $-\frac{1}{\sqrt[3]{10}}$ (Even though most calculators will not check them, they are correct.)
25. no solution