Natural Log and e Problems

Solve for x.

(Express your answers in terms of e and ln. If complicated, also give a numeric approximation.)

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

ANSWERS ARE ON OPPOSITE SIDE

ANSWERS

1. $1/e$
2. 0
3. $1/e$
4. 1
5. $1/e^2$
6. e
7. 1
8. no solution
9. 0
10. 1
11. e or $1/e$
12. $e^{\pm\sqrt{\ln 2}} - 1$, approximately 1.299184767 or -0.565063228
13. $\ln\left(\dfrac{\ln 100}{\ln 2}\right)$, approximately 1.8936925464
14. no solution
15. 0
16. $\ln 17/e$, approximately 1.042280942
17. 1 or -1
18. $1/99$ or $-100/99$
19. $e^{\frac{-\ln 9 \pm \sqrt{(\ln 9)^2+32}}{2}}$, approximately 6.928776 or 0.160362
20. e^{-2} or e^{-4}
21. $\ln 9$
22. $\pm\sqrt{\ln 100}$ (Note: $\sqrt{\ln 100} \neq \ln 10$. Answers are approximately ± 2.145966026.)
23. $\ln 10$
24. $-\sqrt[3]{e}$ and $-\dfrac{1}{\sqrt[3]{e}}$ (Even though most calculators will not check them, they are correct.)
25. no solution