

Name _____ Date _____ Per _____

**Solve each logarithmic equation. Don't forget to check domain and eliminate extraneous solutions!
Express irrational solutions in exact form and as decimals rounded to 3 decimal places.**

1. $\log_4 x = 2$

2. $\log(x+6) = 1$

3. $\log_3(3x-1) = 2$

4. $\log_x\left(\frac{1}{8}\right) = 3$

5. $5\ln x - 3 = -1$

6. $\frac{1}{4}\ln(x+7) = 1$

7. $\log_4(x+2) = \log_4 8$

8. $\frac{1}{2}\log_3 x = 2\log_3 2$

9. $2\log_3(x+4) - \log_3 9 = 2$

10. $\log x + \log(x+15) = 2$

11. $\log(2x+1) = 1 + \log(x-2)$

12. $\log_8(x+6) = 1 - \log_8(x+4)$

13. $\ln(x+2) + \ln(x-5) = \ln(x+11)$

$$14. \log_a(x-1) - \log_a(x+6) = \log_a(x-2) - \log_a(x+3)$$

Solve each exponential equation. Express irrational solutions in exact form and as decimals rounded to 3 decimal places.

$$15. e^{-2x} = \frac{1}{3}$$

$$16. 10^{x-9} = 15$$

$$17. e^{2x+5} = 8$$

$$18. 5e^{0.2x} = 7$$

$$19. 4e^{x+1} = 5$$

$$20. 8(10)^{2x-7} = 3$$

$$21. 2^x = 10$$

$$22. 8^{-x} = 1.2$$

$$23. 5(2^{3x}) = 8$$

$$24. e^{2x-3} = 7^x$$

$$25. 10^{x+5} = 3^{3x-2}$$

$$26. 2^{4x+1} = 5^{2-x}$$

$$27. 3^{1-2x} = 4^x$$

29. The normal healing of wounds can be modeled by the formula $A(n) = A_0 e^{-0.35n}$, where A_0 is the original area of a wound, and A is the area of the wound n days after an injury. Suppose that a wound initially had an area of 100 square millimeters.
- a) What will the area of the wound be after 3 days?

b) How long will it take for the area of the wound to be half its original area?

30. A model for the number N of people in a college community who have heard a certain rumor is $N = P(1 - e^{-0.15d})$, where P is the total population and d is the number of days that have elapsed since the rumor began. In a community of 1000 students, how many days will elapse before 450 students have heard the rumor?